Muratec™

# F-110

## FIELD ENGINEERING MANUAL

## *U.S. version 1.0*

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# 1. Precautions

Please read the following carefully to prevent any accidents and not to damage the unit during service.

## 1-1 Safety Precautions

**1. Safety Precautions**
There are some electric or machinery parts with safety related property. If the parts replaced are different from the original, the safety may not function. Even if the part could allow higher voltage than that of the part used, do not replace it and use a regular product clarified in specifications.

2. Be careful not to leave a switch, a cover or a safety device out when reinstalling or assembling the product after repair.

**3. Replacing Precautions**
Do not change or add parts as you like. You cannot benefit from such a remodeled product at your will during the term of guarantee.

4. You must replace overheated or damaged parts or cords with regular products. Please solve the problem causing any damage or overheating and troubles beforehand.

**Especially mind the safety on the part with this mark.**
You must use regular parts described in specifications for the parts inflammable and where the current can be flown. Otherwise any hazard such as an electric shock or a fire could occur.

LASER STATEMENT (LASERTURVALLISUUS)

WARNING : NEVER OPERATE AND SERVICE THE PRINTER WITH THE PROTECTIVE COVER REMOVED FROM LASER/SCANNER ASSEMBLY. THE REFLECTIVE BEAM, ALTHOUGH INVISIBLE, CAN DAMAGE YOUR EYES.

Class 1 laser product

Luokan 1 laserlaite
Klass 1 laser apparat

Allonpituus 770-795nm
Teho 0.3mW±0.03mW

| | |
|---|---|
| **CAUTION** | INVISIBLE LASER RADIATION WHEN THIS COVER OPEN. DO NOT OPEN THIS COVER. |
| **VORSICHT** | UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEOFFNET. NIGHT DEM STRAHL AUSSETZEN. |
| **ATTENTION** | REYONNEMENT LASER INVISIBLE EN CAS D'OUVERTURE. EXPOSITION DANGERUSE AU FAISCEAU. |
| **ATTENZIONE** | RADIAZIONE LASER INVISIBLE IN CASO DI APERTURA. EVITARE L'ESPOSIZONE LA FASCIO. |
| **PRECAUCION** | REDIACION LASER INVISIBLE CUANDO SE ABRE. EVITAR EXPONERSE AL RAYO. |

**CAUTION :** Avoid exposure to invisible laser radiation when the development unit is not installed.

## 1-2 Precautions on Disassembly and Reassembly

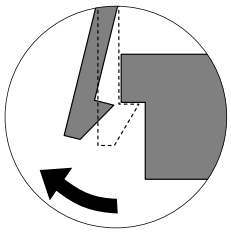
Very careful precautions should be taken when replacing parts. Before replacing, please check cables because you cannot put the cables that you removed for replacing parts into the proper place if you would not make sure of where they were connected and in which condition.

### Please do the following before disassembling for a repair or replacement of parts.

1. Pull out paper cassette, printer cartridge installed. Especially careful not to be scratched by the surface of developer or not to expose them to light.
2. Turn the power switch off.
3. Take out the power plug, printer cable from the printer.
4. Use only the same type of part as original when replacing parts.
5. Do not force to open or fasten plastic material components.
6. Be careful that small parts such as screws should not get in the printer.
7. When disassembling, assembling, also observe small components are located in place.
8. If you uncover and turn the machine over to replace some parts, toner or paper particles may contaminate the LSU window. Protect the LSU window with clean paper.

### Releasing Plastic Latches

Many of parts are held in place with plastic latches.
The latches break easily : release them carefully.
To remove such parts, press the hook end of the latch away from the part to which it is latched.



## 1-3 ESD Precautions

Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called “Electrostatically Sensitive (ES) Devices”, or ESDs. Examples of typical ESDs are: integrated circuits, some field effect transistors, and semiconductor “chip” components.
The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

**CAUTION:**
Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

1. Immediately before handling a semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, employ a commercially available wrist strap device, which should be removed for your personal safety reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ESDs, place the assembly on a conductive surface, such as aluminum or copper foil, or conductive foam, to prevent electrostatic charge buildup in the vicinity of the assembly.

3. Use only a grounded tip soldering iron to solder or desolder ESDs.

4. Use only an “anti-static” solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ESDs.

5. Do not use Freon-propelled chemicals. When sprayed, these can generate electrical charges sufficient to damage ESDs.

6. Do not remove a replacement ESD from its protective packaging until immediately before installing it. Most replacement ESDs are packaged with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.

7. Immediately before removing the protective shorting material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

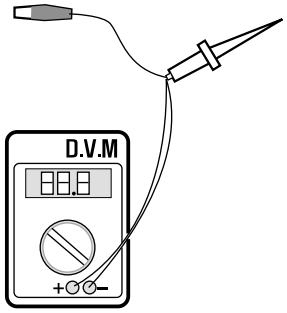
8. Maintain continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.

9. Minimize bodily motions when handling unpackaged replacement ESDs. Normal motions, such as the brushing together of clothing fabric and lifting one’s foot from a carpeted floor, can generate static electricity sufficient to damage an ESD.

## 1-4 Tools for Troubleshooting

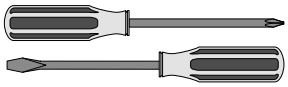
The following tools are recommended for safe and smooth troubleshooting described in this service manual.

1 **DVM(Digital Volt Meter)**
Standard: Indicates more than 3 digits.




2 **Electronic Scale**
Standard: Equipment to check the weight of consumables(toner cartridge) . (The gram unit can be measured.)

3 **Driver**
Standard: "-" type, "+" type (M3 long, M3 short, M2 long, M2 short)

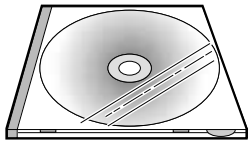


4 **Pinset**
Standard: For general home use, small type.

5 **Cotton Swab**
Standard: For general home use, for medical service.

6 **Cleaning Equipments a IPA(Isopropyl Alcohol)dry cloth or a soft stuff neutral detergent.**

7 **Software(Driver) installation CD ROM**



**Note** Mind your hands not to be touched when you disassemble and reassemble PBA ASS'Y, such as the main board, SMPS, HVPS.

# 2.Specifications

| ITEMS | | | DESCRIPTION | REMARKS |
|---|---|---|---|---|
| General | Size(W*D*H) | | 331 X 355.6 X 194.2 mm | |
| | Weight | | 10.2Kg (With accessories) | |
| | Power Rating | | AC 110V ~ 120V ± 15%, 50/60Hz ± 3Hz | |
| | | | AC 220V ~ 240V ± 15%, 50/60Hz ± 3Hz | |
| | Operating Environment | | Temperature : 10 ~ 32°C | |
| | | | Humidity : 20 ~ 85% RH | |
| | LCD | | 16 X 1 Char | |
| | Interface | | ECP(IEEE1284) | |
| | Halftone | | 64 Level | |
| | Maintenance Cycle | | 60,000 Pages | |
| Power | Power Button | | No | |
| | Input Voltage | | 110V~120V | |
| | Power | Idle | 10 W/H | |
| | Consumption | Max | 140 W/H | |
| | Power Save Mode | | OFF, 5, 10, 15 Min | |
| Print | Print Method | | Laser | |
| | Speed | | 8ppm | |
| | Resolution | Normal | 600 x 600 DPI | |
| | Print language | | GDI | |
| | Toner Save | | 30 ~ 50 % | |
| Scan | Scan Method | | CIS(Mono) | |
| | Quick Scan Speed | | 3 sec | |
| | Resolution | | 300 x 300 DPI | |
| | Scan Width | Max | 216 mm | |
| | | Effective | 210 mm | |
| | Scan Length | Max | 1000 mm | |
| | | Std Mode | 356 mm | |
| Copy | Speed | | 8 ppm | |
| | Resolution | | 600 x 600 DPI | |
| | Zoom Range | | 50 ~ 200% | |
| | Collate/Reverse | | Yes | |
| | Multi Copy | | 1 ~ 99 | |

| ITEMS | | | DESCRIPTION | REMARKS |
|---|---|---|---|---|
| Telephone | Handset | | No | Optional |
| | 1-Touch Dial | | 20EA | |
| | Speed Dial | | 80EA | |
| | Group Dial | | 20EA | |
| | Caller ID | | Yes | |
| | TAD | | No | |
| | TAD I/F | | Yes | |
| | Tone/Pulse | | Tone (DTMF)<br>Pulse : Tech Mode only | |
| | No Power Operation | | No | |
| | Earth/Recall | | No | |
| | External Phone Transfer | | Yes | |
| FAX | Compatibility | | ITU-T G3 | |
| | Communication System | | PSTN/PABX | |
| | Modem Speed | | 33.6Kbps Fax Modem | |
| | TX Speed | | 3sec (Using CCITT #1 Chart with Sandard Resolution) | |
| | Compression | | MH/MR/MMR | |
| | Rcv. Mode | | TEL, FAX, AUTO, ANS/FAX | |
| | ECM | | Yes | |
| | DRPD | | Yes | |
| | Resolution | Std | 203 * 98dpi | |
| | | Fine | 203 * 196dpi | |
| | | S.Fine | 203 * 392dpi | |
| | Memory | Capacity | 2MB(160 pages) | |
| | | Optional Memory | No | |
| | Functions | Voice Request | Yes | |
| | | TTI | Yes | |
| | | RTI | Yes | |
| | | Polling | Yes | |
| | | Flash | Yes | |
| | | Auto Reduction | Yes | |
| | | Broadcasting | 119 Locations | |
| | | Forced Memory | Yes | |
| | | Delay TX | 10 Commands | |
| | | Memory RX | Yes | |
| | | RDC | Yes | |
| | Battery B/U | | Yes (Max 30 Min) | |

| ITEMS | | | DESCRIPTION | REMARKS |
|---|---|---|---|---|
| Paper Handling | ASF | Type | BIN | |
| | | Input Capacity | 150 Sheets / 20lb | |
| | | Optional Cassette | No | |
| | | Output Capacity | 100 Sheets / 20lb | |
| | | Output Control | Face up | |
| | | Bypass | Yes(single page) | |
| | | Media Type | Plain, Coated, Transparency, Envelop, Card,Post Card, Label | |
| | | Media Size | • Paper : A4, Letter, Legal, Folio, Executive, B5, A5 | Envelop : Manual feeding only |
| | | | • Envelop : 6 3/4, 7 3/4, #9,#10, DL, C5, B5, Baronial | |
| | | Media Weight | 16~43 lb(Bypass) | |
| | ADF | Input Capacity | 30 Sheets / 20 lb | |
| | | Media Weight | 12 ~ 69 lb | |
| Software | Driver | Printer | GDI | |
| | | TWAIN | Yes | |
| | | PC-FAX | No | |
| | Media | CD-ROM | Yes | |
| | | Diskette | No | |
| | Compatibility | | Win 95/98/ME/NT/2000/XP | |
| | Y2K Compliant | | Yes | |
| Toner Cartridge | Life | Initial | 1,500 Pages | Using 4% Coverage Pattern |
| | | Running | 3,000 Pages | Using 4% Coverage Pattern |
| | Toner Sensor | Support | Yes | |
| | | Metthod | Software | Dot Counting |
| Maintena -nce Cycle | ADF Rubber | | 10K Pages Scan | |
| | Paper Feeding Rolle | | 50K Pages Printr | |
| | Transfer Roller | | 60K Pages Print | |
| | Fuser Unit | | 50K Pages Print | |

# 3. Disassembly and Reassembly

## 3-1 General Precautions on Disassembly

When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must.

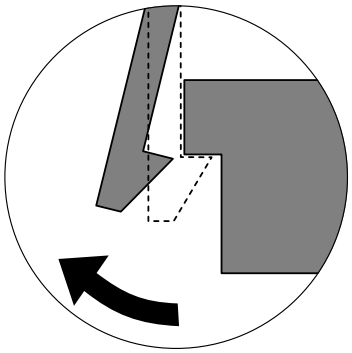
If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

**Whenever servicing the machine, you must perform as follows:**

1. Check to verify that documents are not stored in memory.
2. Be sure to remove the toner cartridge before you disassemble parts.
3. Unplug the power cord.
4. Use a flat and clean surface.
5. Replace only with authorized components.
6. Do not force plastic-material components.
7. Make sure all components are in their proper position.

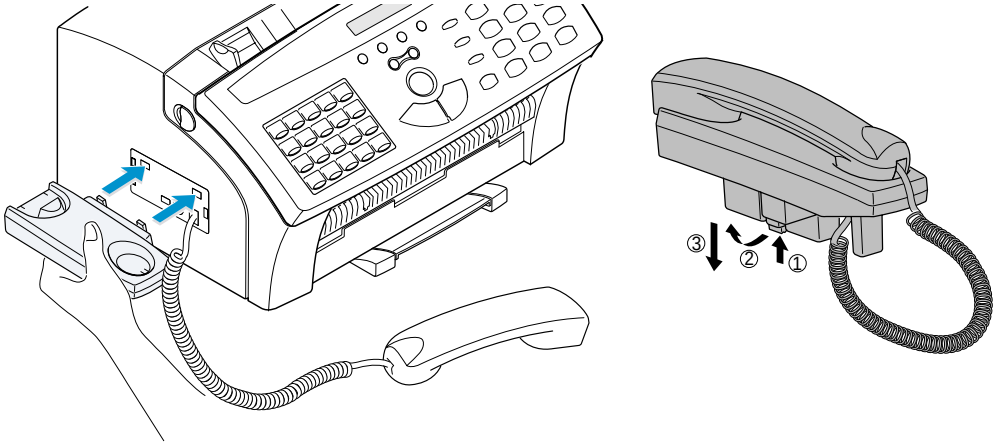
### Releasing Plastic Latches

Many of the parts are held in place with plastic latches. The latches break easily; release them carefully.
To remove such parts, press the hook end of the latch away from the part to which it is latched.



## 3-2 Cradle

1. Push the lever and remove the cradle as shown below.

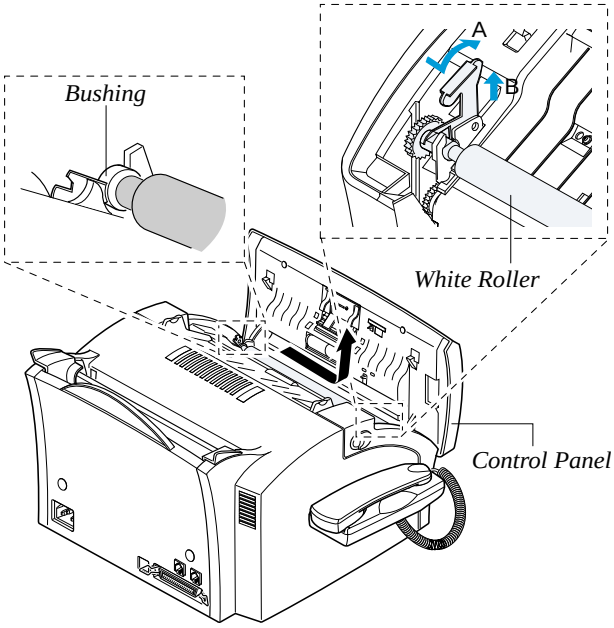



## 3-3 White Roller

1. Open the OPE cover.

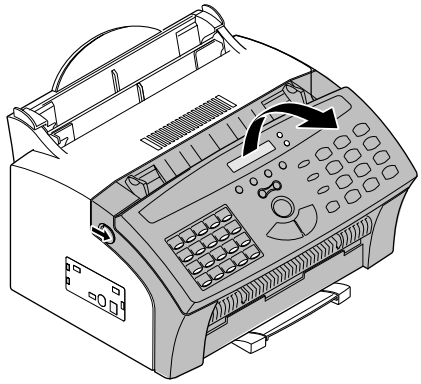
2. Push the bushing on the end of the roller slightly inward, then rotate it until it reaches the slot. Then lift, the roller out.

**Note :** Check the roller for any dirt. If dirty, wipe it off with soft cloth dampened with water. If the roller is heavily worn, replace it with a new one.

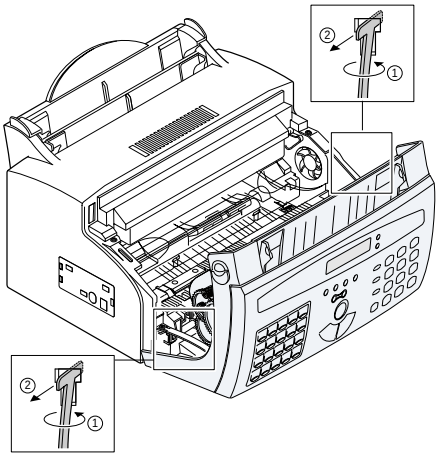


## 3-4 OPE Cover

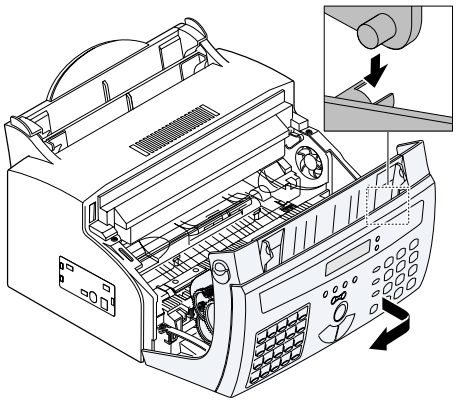
1. Pull the cover release button on both sides of the machine, and open the front cover.



2. Remove two stoppers holding the front cover unit and unplug one connector and one wire.

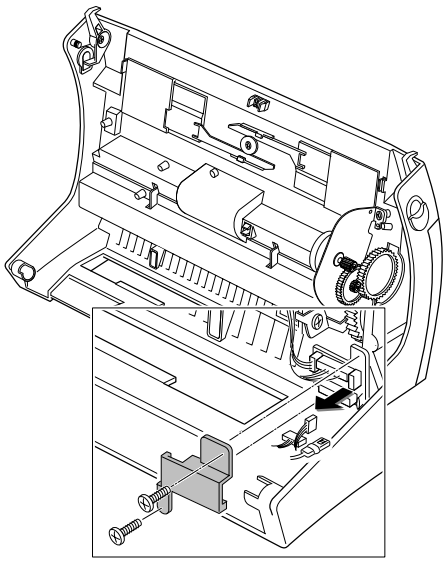



3. Pull the bottom left end of the cover downward to unlatch the front cover unit and remove the cover from the main frame.

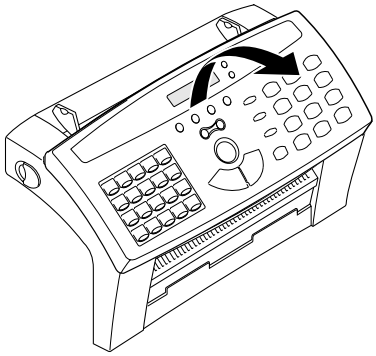


4. Remove two screws securing bracket scan board, then take out the bracket scan board.

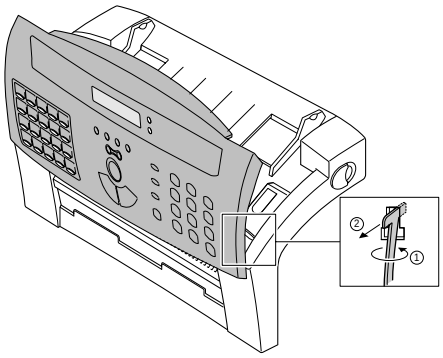
5. Unplug two connectors and one wire from the scan board.



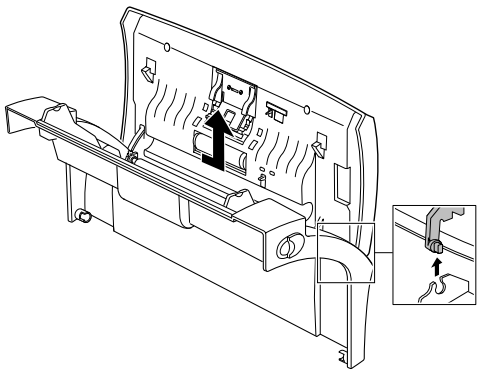
6. Lift the OPE cover.



7. Remove the stopper holding the OPE cover.



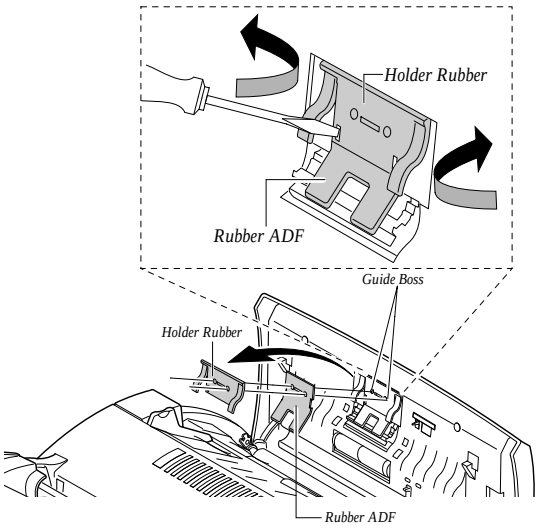

8. Unlatch the bottom ends, then remove the OPE cover.

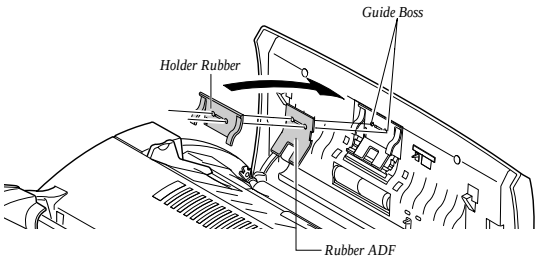


## 3-5 ADF Rubber

1. Open the OPE unit.

2. Insert a flat blade screw driver and pinset into the slot as shown below, and release the latches. Take out the Holder Rubber, Sheet ADF and the Rubber ADF.

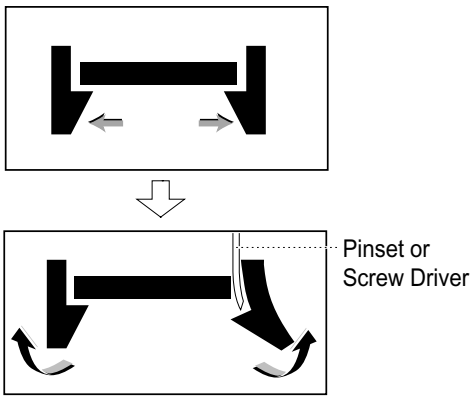



**Notes :** • When you reassemble the them, be sure that the Rubber ADF and Holder Rubber fit into the guide boss and the Holder Rubber latches fit into the corresponding hole. Then push firmly until it clicks.

**⚠ Safely Precautions :**

Do not force to open or fasten plastic material components.




3. Clean the surface of the rubber pad with IPA (Isopropyl Alcohol). After wiping it, be sure to dry it. Check the rubber wear. If the wear reaches 1/2 its original thickness, replace it with a new one.

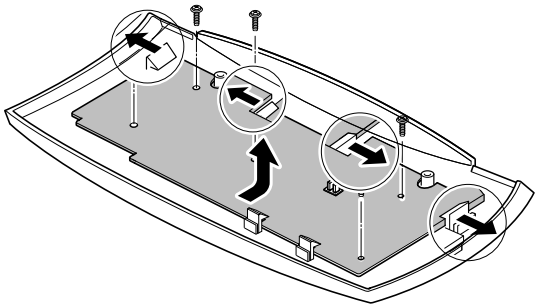
## 3-6 OPE Board

1. Before you remove the OPE board, you should remove:

   – OPE cover (see page 3-3)

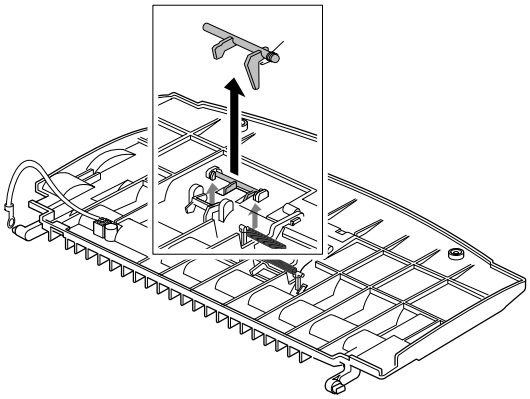
2. Remove four screws securing the OPE board.

3. Release two latches securing the both side of the LCD and the two of four latches securing the board. Then remove the OPE board.



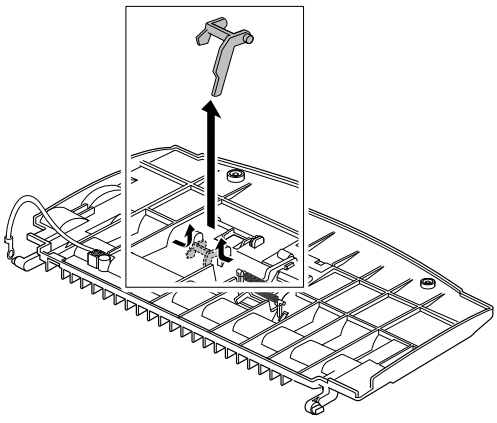
## 3-7 Lever sensor Doc.

1. Unlatch the lever sensor Doc from the scan upper frame and take it out.



## 3-8 Lever sensor Scan

1. Push the both sides of Lever sensor Scan inward, then unlatch and take out the sensor Scan from the scan upper frame.

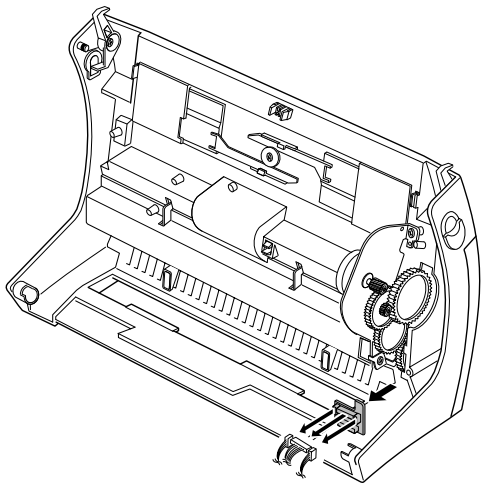


## 3-9 Scan board

1. Before you remove Scan board, you should remove:

   – Bracket scam board (see page 3-3)

2. Unplug all the connectors from the scan board and remove the board.



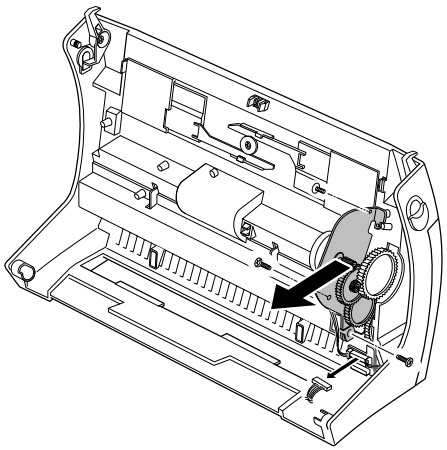
## 3-10 Scan Motor

1. Before you disassemble Scan motor, you should remove:

   – OPE cover (see page 3-3)
   – Bracket scan board (see page 3-3)

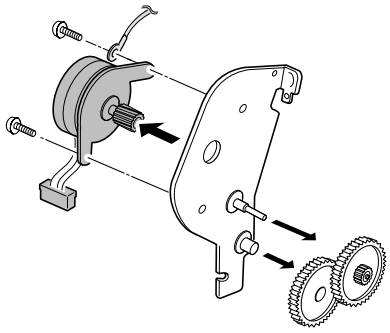
2. Unplug one connector from the scan board.

3. Remove three screws, then remove the motor ass'y from the main frame.



4. Take out the gear from the motor ass'y.

5. Remove two screws and remove the motor.

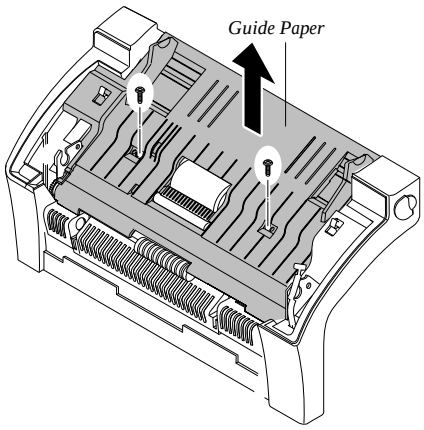


## 3-11 ADF roller

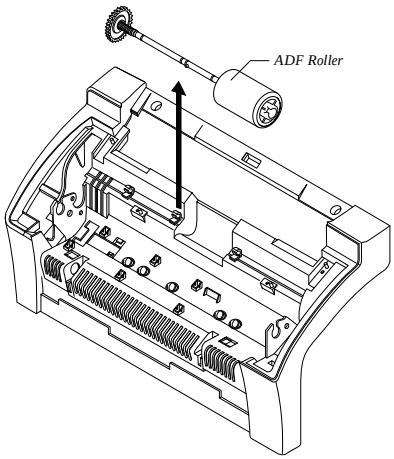
1. Before you remove the ADF roller, you should remove:

   – OPE cover (see page 3-3)

2. Remove two screws securing the guide paper and remove the guide paper.

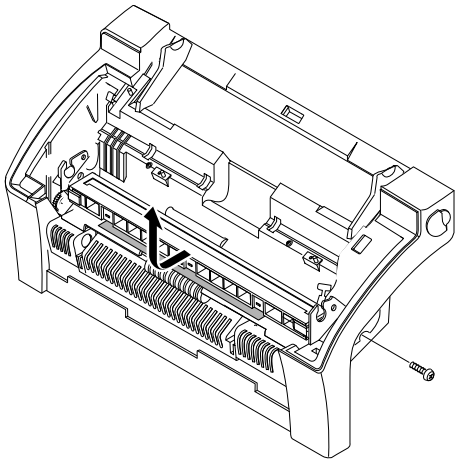



3. Remove ADF roller from the scan front frame.

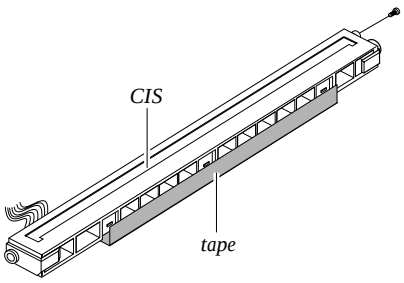



## 3-12 CIS

1. Remove one screw and push CIS as shown below and lift it.



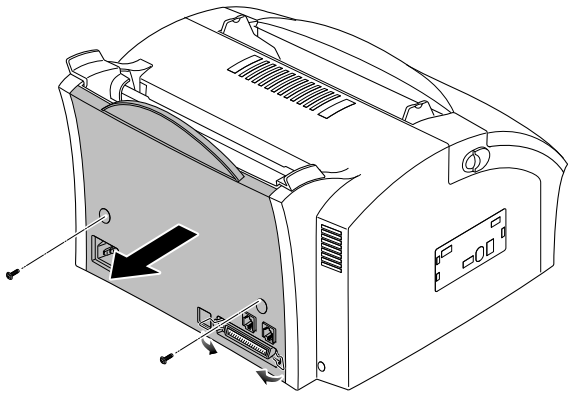
2. Separate the Dummy CIS from CIS.



## 3-13 Rear cover

1. Remove two screws.

2. Push the metal clip on the parallel port down and remove the rear cover from the main frame.

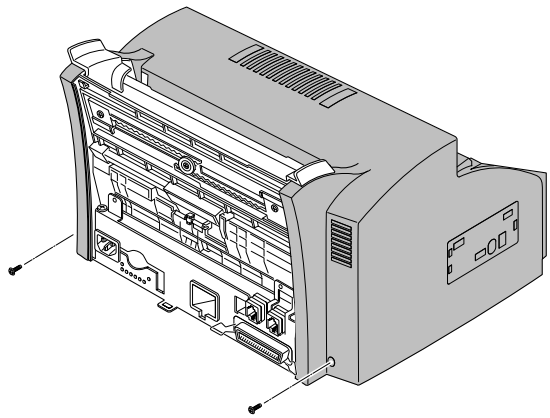


## 3-14 Top cover

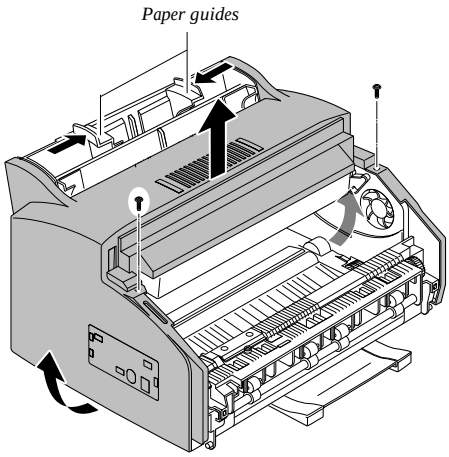
1. Before you remove the ADF roller, you should remove:

   – OPE cover (see page 3-3)
   – Rear cover (see above)

2. Remove two screws securing the top cover from the back side of the machine.



3. Remove two screws and slide the left and right paper guides fully inward. Then spread the bottom of the top cover and lift the cover to remove.

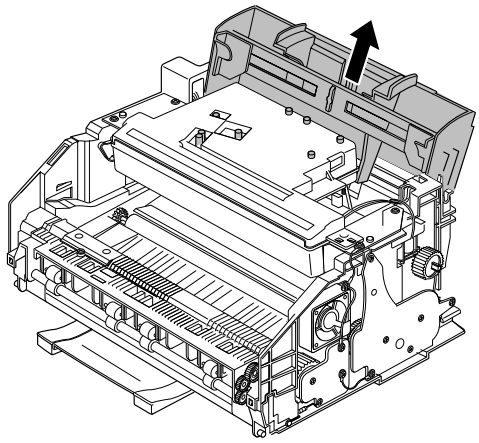


## 3-15 Tray

1. Before you remove the tray, you should remove:

   – OPE cover (see page 3-3)
   – Rear cover (see page 3-9)
   – Top cover (see page 3-9)

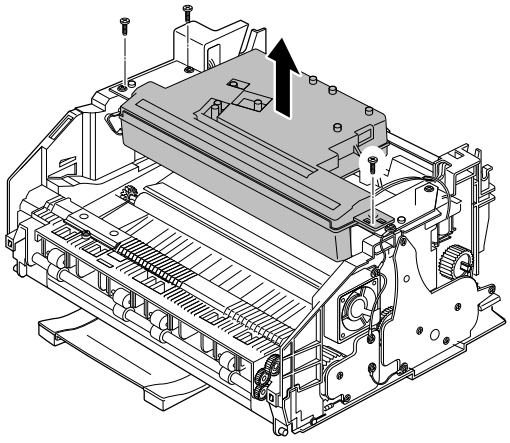
2. Take out the tray from the main frame.



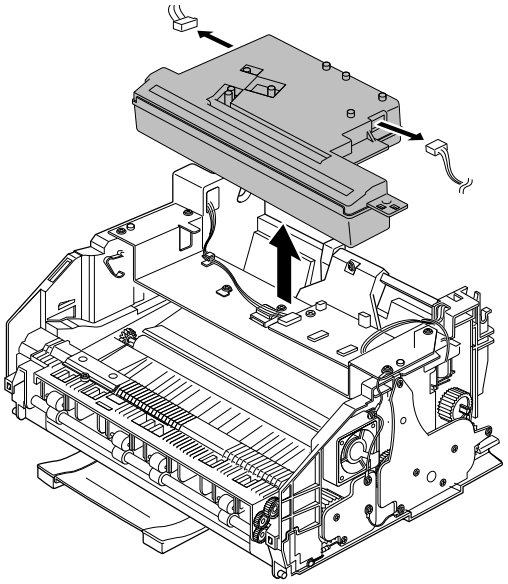
## 3-16 LSU

1. Before you remove the LSU, you should remove:
   – All covers (see page 3-3, 3-9)

2. Remove three screws securing the LSU.



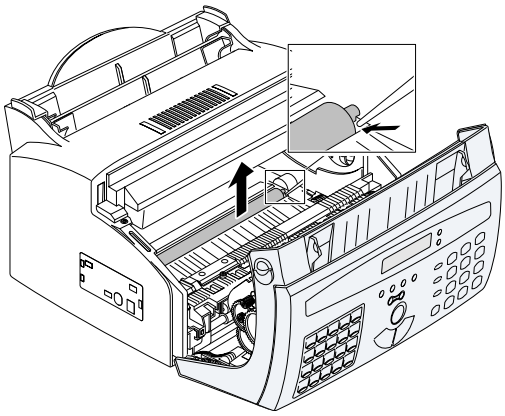
3. Unplug two connectors from the LSU and remove the LSU.



## 3-17 Transfer roller

1. Pull the cover release button on both sides of the machine, and open the front cover.

2. Lift the transfer roller using a proper tool (-Driver) and take out the roller.

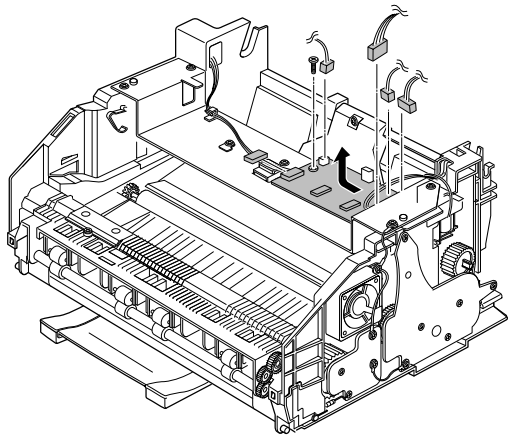


## 3-18 Engine board

1. Before you remove the Engine board, you should remove:

   – All covers (see page 3-3, 3-9)
   – LSU (see page 3-10)

2. Unplug five connectors and remove one screw from the engine board, then remove the board.

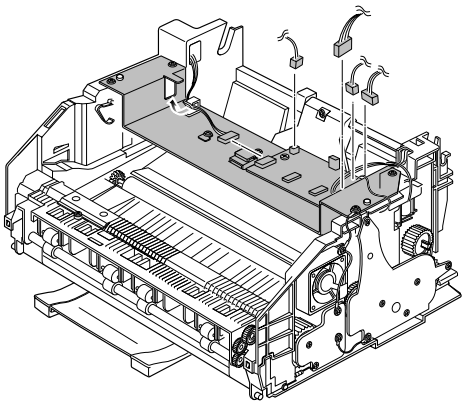


# 3-19 Pick-up roller ass'y

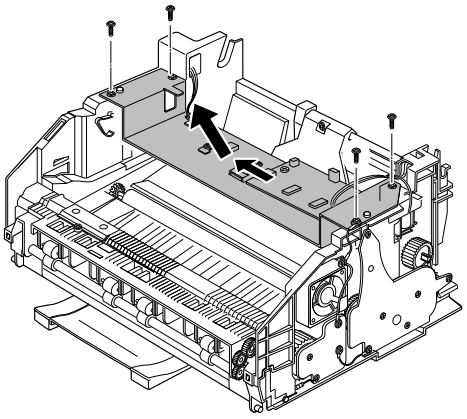
1. Before you remove the pick-up roller ass'y, you should remove:

   – All covers (see page 3-3, 3-9)
   – LSU (see page 3-10)

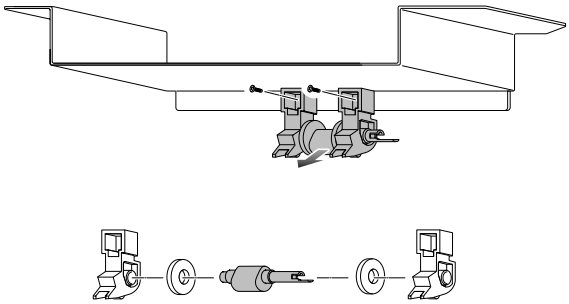
2. Unplug all the connectors from the engine board.



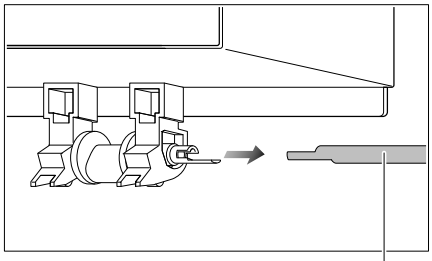
3. Remove four screws securing the plate upper and remove the plate upper as below.



4. Remove two screws and remove the roller from the plate.



**Note :** When you reassemble the pick-up roller, make sure that the right end of the pick-up roller fits into the pick-up gear shaft.



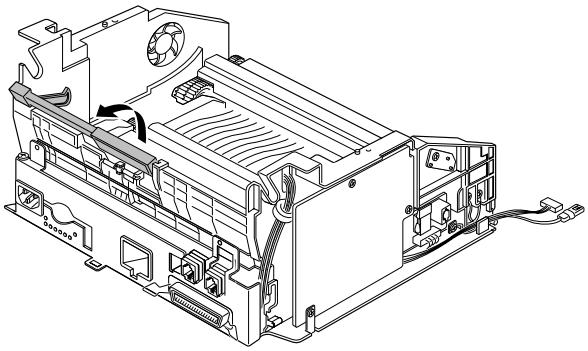
*Pick-up gear shaft*

## 3-20 Knock-up ass'y

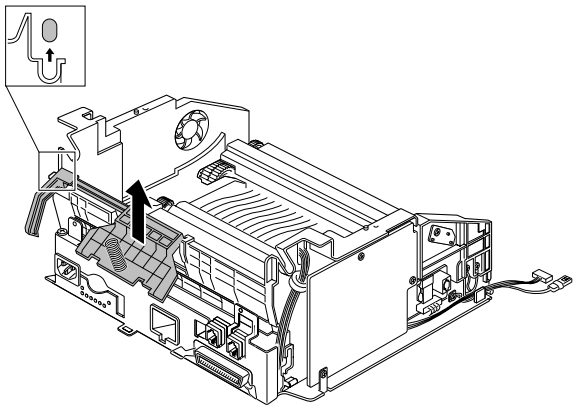
1. Before you remove the knock-up ass'y, you should remove:

   – All covers (see page 3-3, 3-9)
   – LSU (see page 3-10)
   – Plate upper (see page 3-12)

2. Pull the knock-up ass'y fully backward.



3. Remove the knock-up ass'y from the main frame.

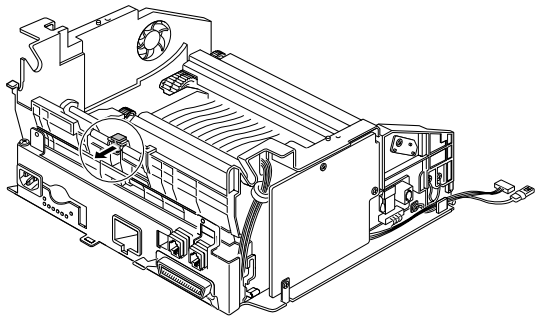


## 3-21 Cap-pad

1. Before you remove the cap-pad, you should remove:

   – All covers (see page 3-3, 3-5)
   – LSU (see page 3-10)
   – Plate upper (see page 3-12)
   – Knock-up ass'y (see above)

2. Take out the cap-pad from the main frame.

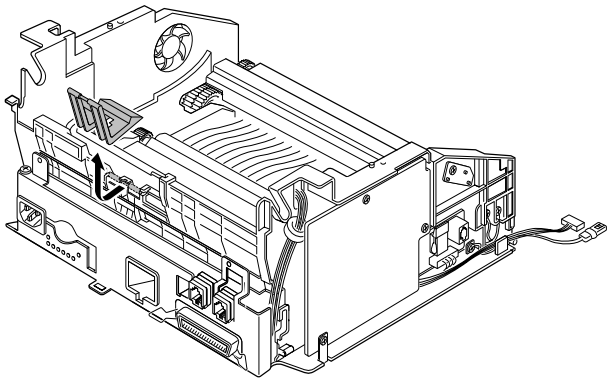


## 3-22 Holder-pad

1. Before you remove the holder-pad, you should remove:

   – All covers (see page 3-3, 3-9)
   – LSU (see page 3-10)
   – Plate upper (see page 3-12)
   – Knock-up ass'y (see 3-13)
   – Cap-Pad (see 3-13)

2. Remove the holder-pad from the main frame.

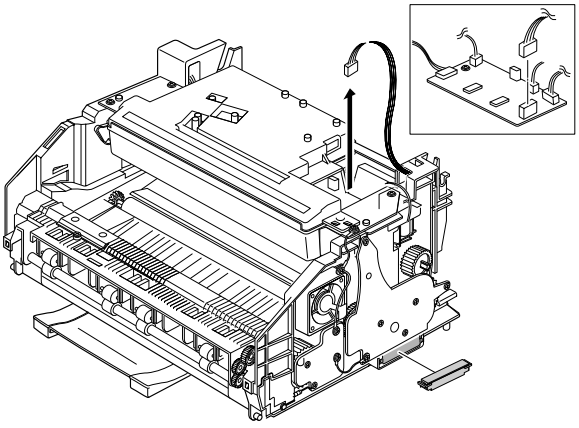


## 3-23 Motor ass'y

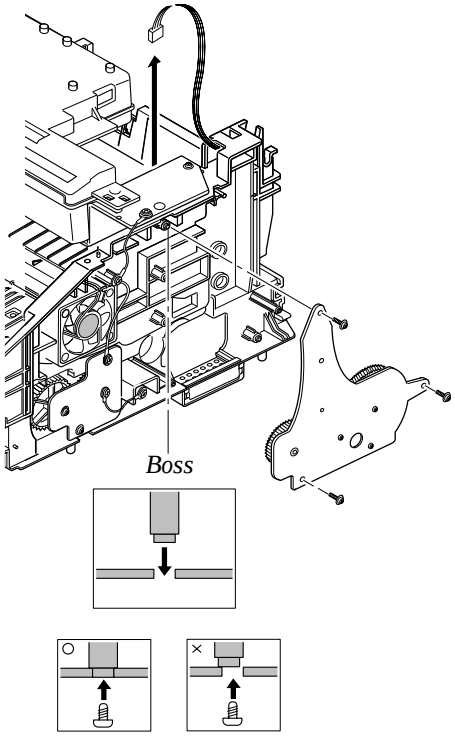
1. Before you remove the motor ass'y, you should remove:

   – All covers (see page 3-3, 3-9)

2. Remove four screws securing the motor ass'y and unplug one connector from the engine board, then remove the motor ass'y.



**Note :** When you reassemble the motor ass'y, make sure that the boss shown in the figure below fit into the corresponding screw holes on the motor ass'y to allow the screws to be fastened properly.

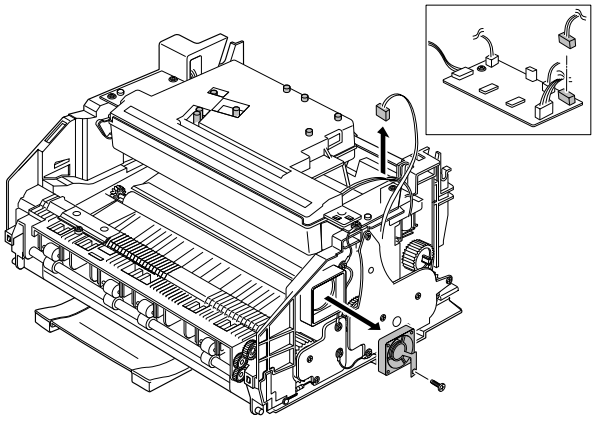


## 3-24 Fan

1. Before you remove the fan, you should remove:

   – All covers (see page 3-0)
   – Motor ass'y (see page 3-15)

2. Unplug one connector from the engine board and remove the fan.

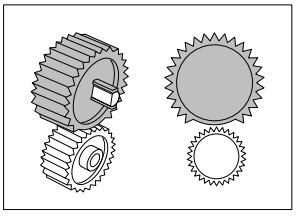


## 3-25 Gear pick-up ass'y

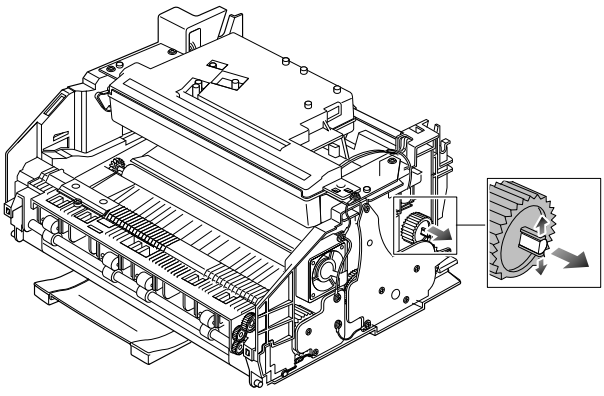
1. Before you remove the gear pick-up ass'y, you should remove:

   – All covers (see page 3-3, 3-9)

**Note:** When reassembling, make sure that the direction of the gear is correct.



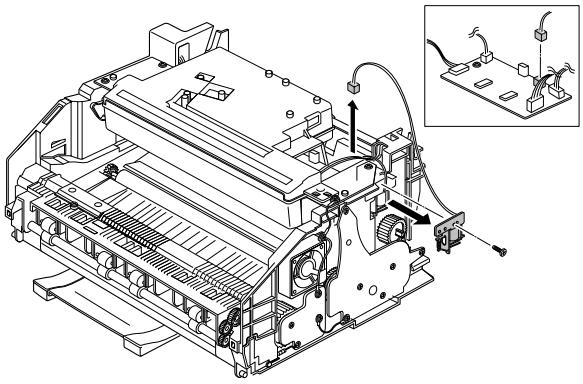
2. Release two snap-fits and remove the gear pick-up ass'y from the main frame.



## 3-26 Solenoid

1. Before you remove the solenoid, you should remove:
   – All covers (see page 3-3, 3-9)

2. Unplug one connector from the engine board and remove one screw, then remove the solenoid.

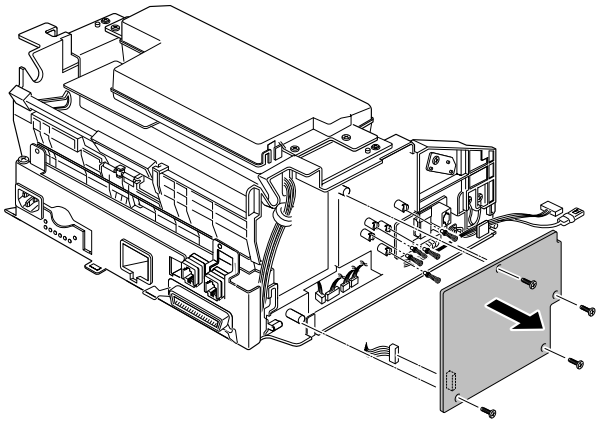


## 3-27 HVPS board

1. Before you remove the HVPS board, you should remove:

   – All covers (see page 3-3, 3-9)

2. Remove three screws and one connector from the HVPS board, then remove the board.



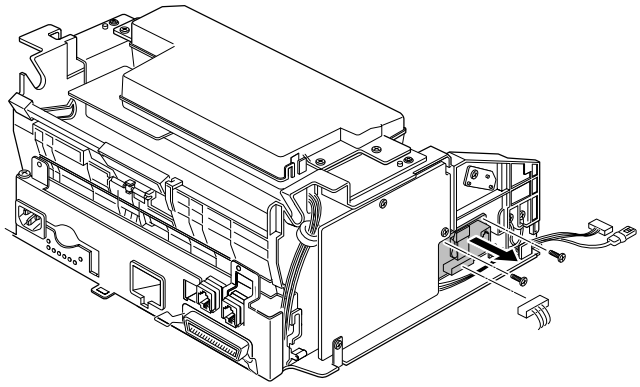
**Note :** when reassembling, make sure that the terminal is five.

## 3-28 Hook board

1. Before you remove the hook board, you should remove:

– All covers (see page 3-3, 3-9)

2. Unplug one connector from the main board and remove two screws, then remove the hook board from the main frame.

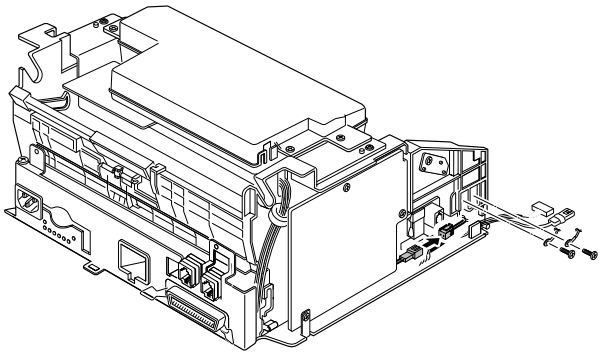


## 3-29 Fuser ass'y

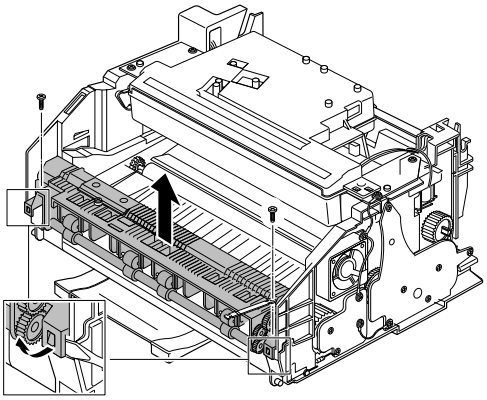
1. Before you remove the fuser ass'y, you should remove:

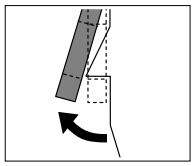
   – All covers (see page 3-3, 3-9)

2. Remove two wires after remove two screws from the main frame and one connector from the inter connector.



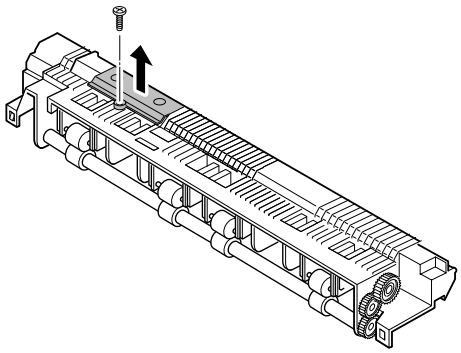
3. Remove two screws and unlatch the fuser ass'y using a proper tool.



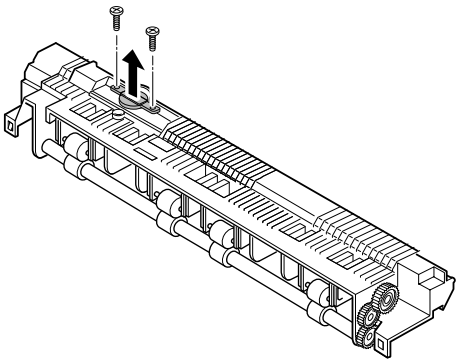


## 3-30 Thermostat

1. Remove one screw and remove the cover thermostat from the fuser ass'y.



2. Remove two screws and take out thermostat from the fuser ass'y.

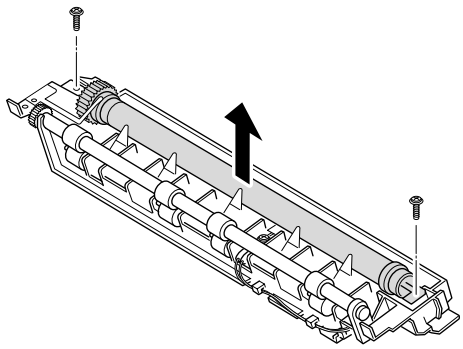


## 3-31 Halogen Lamp

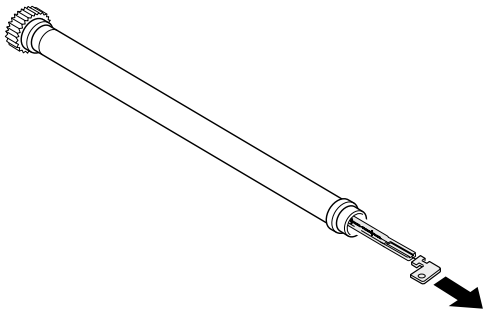
1. Before you remove the thermostat, you should remove:

   – All covers (see page 3-3, 3-9)
   – Fuser ass'y (see page 3-17)

2. On the fuser ass'y, remove the two screws, then remove the heat roller.



3. Remove the halogen lamp from the heat roller.

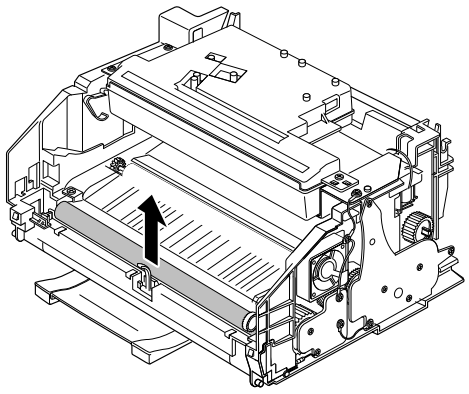


## 3-32 Pressure roller

1. Before you remove the pressure roller, you should remove:

   – All covers (see page 3-3, 3-9)
   – Fuser ass'y (see page 3-17)

2. Lift and remove the pressure roller from the main frame.

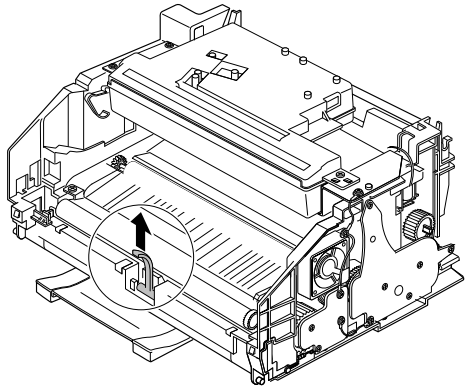


## 3-33 Actuator-exit

1. Before you remove the actuator-exit, you should remove:

   – All covers (see page 3-3, 3-9)
   – Fuser ass'y (see page 3-17)

2. Lift and remove the actuator-exit from the main frame.

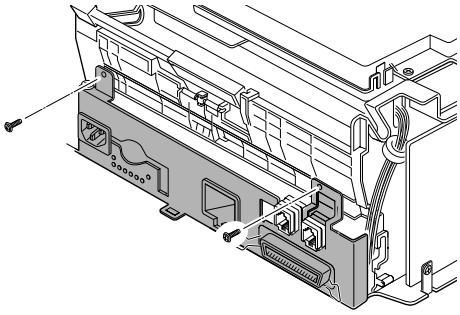


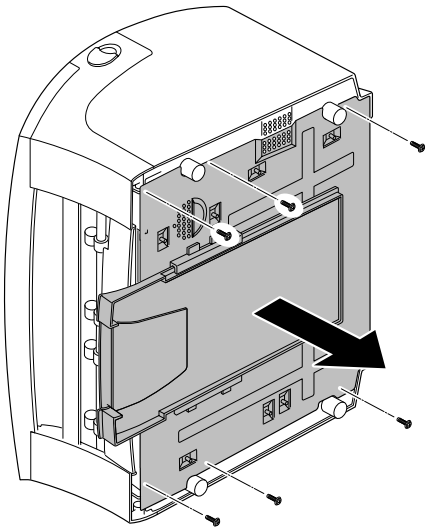
## 3-34 Shield Engine ass'y

1. Before you remove the shield engine ass'y, you should remove:

   – Rear cover (see page 3-9)

2. Remove eight screws securing the shield engine ass'y and remove the shield engine ass'y from the main frame.



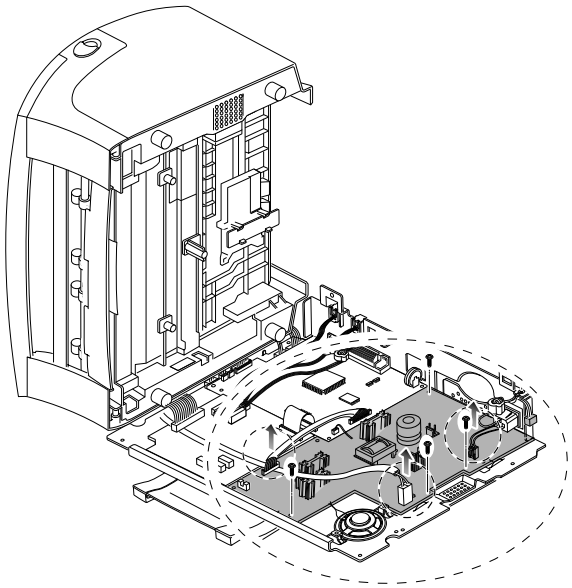


## 3-34 SMPS board

1. Before you remove the SMPS board, you should remove:

   – Rear cover (see page 3-9)
   – Shield Engine ass'y (see page 3-19)

2. Remove four screws and three connectors, then remove the SMPS board from the main frame.

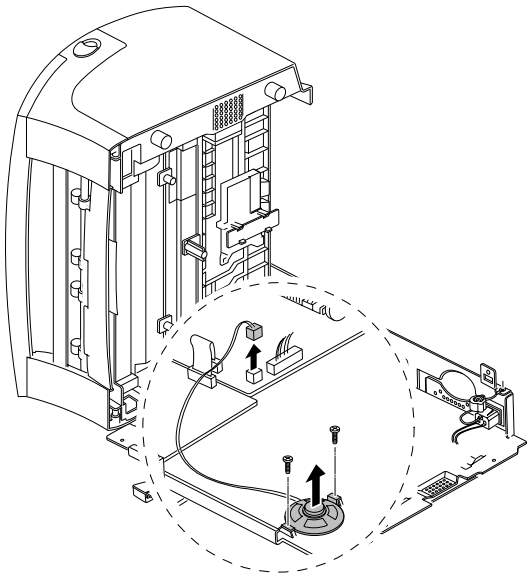


## 3-36 Speaker

1. Before you remove the speaker, you should remove:

   – Rear cover (see page 3-9)
   – Shield Engine ass'y (see page 3-19)
   – SMPS board (see above)

2. Remove one connector that connects the speaker to the main board and two screws securing the speaker, then remove the speaker.

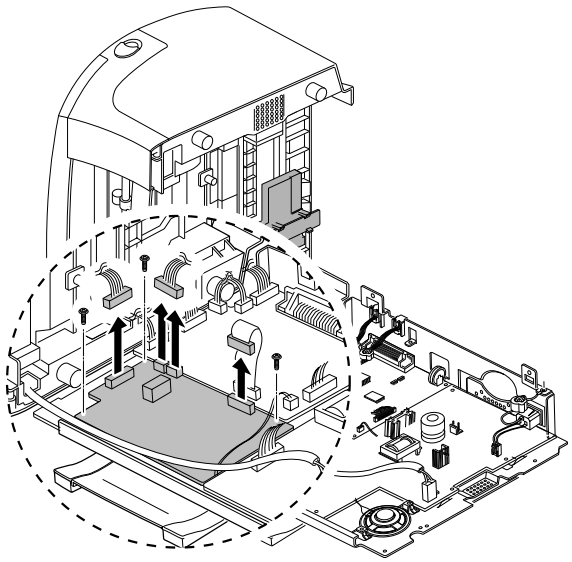


## 3-37 LIU board

1. Before you remove the LIU board, you should remove:

   – Rear cover (see page 3-9)
   – Shield Engine ass'y (see page 3-19)

2. Remove three screws and three connectors from the LIU board, then remove the board from the main frame.

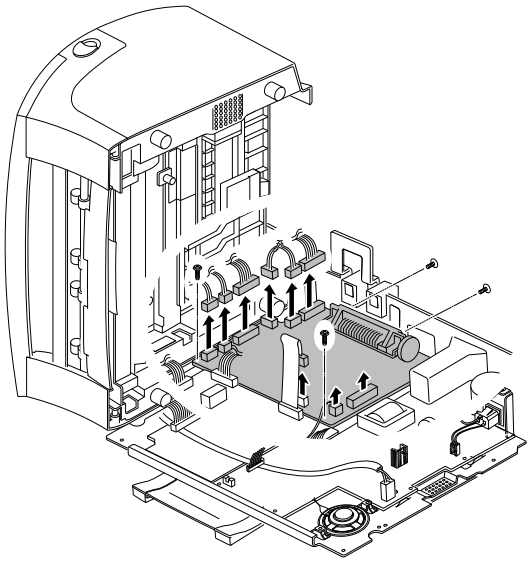


## 3-38 Main board

1. Before you remove the main board, you should remove:

   – Rear cover (see page 3-9)
   – Shield Engine ass'y (see page 3-19)

2. Remove four screws and all the connectors (9) from the main board, then remove the board.

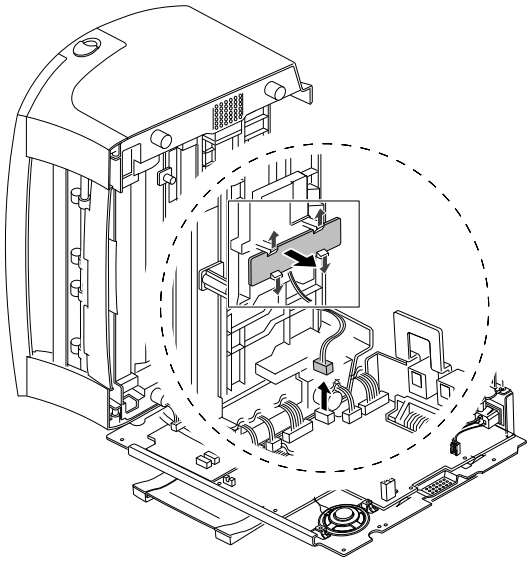


## 3-39 Sensor board

1. Before you remove the sensor board, you should remove:

   – Rear cover (see page 3-9)
   – Shield Engine ass'y (see page 3-19)

2. Release four snap-fits securing the sensor board and unplug one connector from the main board, then remove the sensor board.

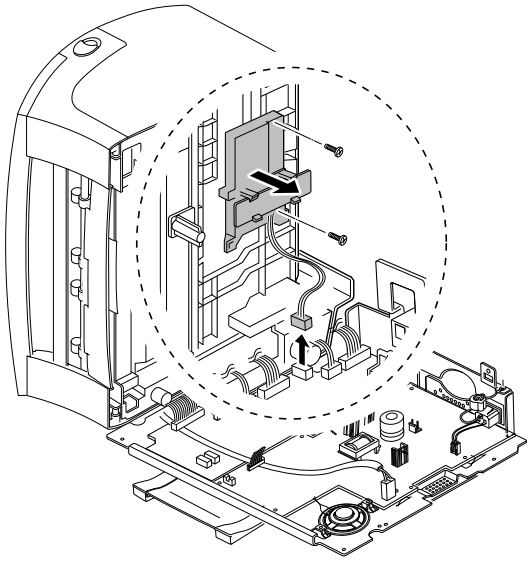


## 3-40 Actuator Empty/Feeder

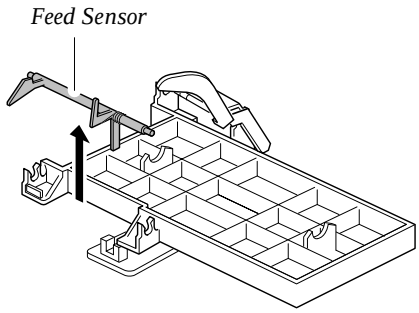
1. Before you remove the actuator empty/feeder, you should remove:

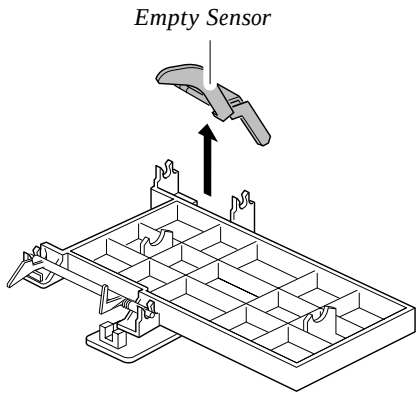
   – Rear cover (see page 3-9)
   – Shield Engine ass'y (see page 3-19)

2. Remove one connector from the main board and two screws securing the holder feed ass'y, then remove the holder feeder ass'y.



3. Remove the Feed sensor and the Empty sensor.



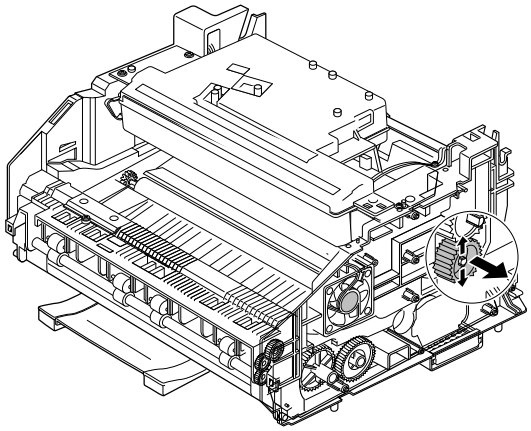



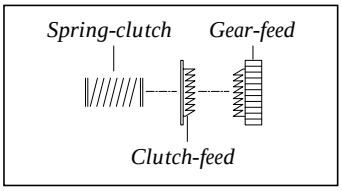
# 3-41 Roller Feeder

1. Before you remove the actuator empty/feeder, you should remove:

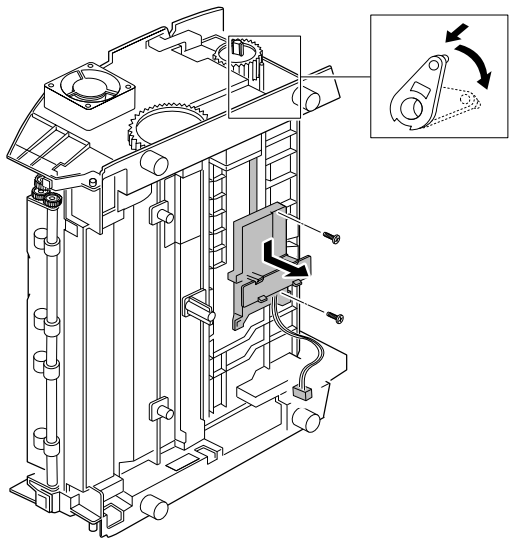
   – All covers (see page 3-0)
   – Motor ass'y (see page 3-15)

2. Release two snap-fits and remove the gear-feed, clutch-feed, and the spring-clutch.

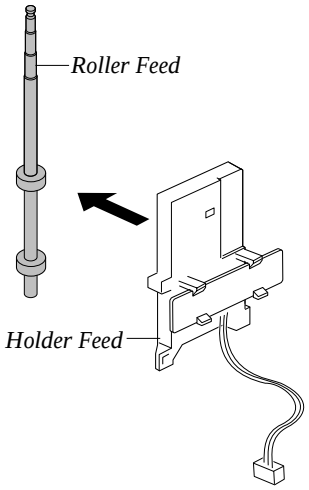





3. Rotate the pick-up bushing as shown below and remove holder feeder ass'y and roller feeder.



4. Separate the Roller Feeder from the Holder Feeder Ass'y.

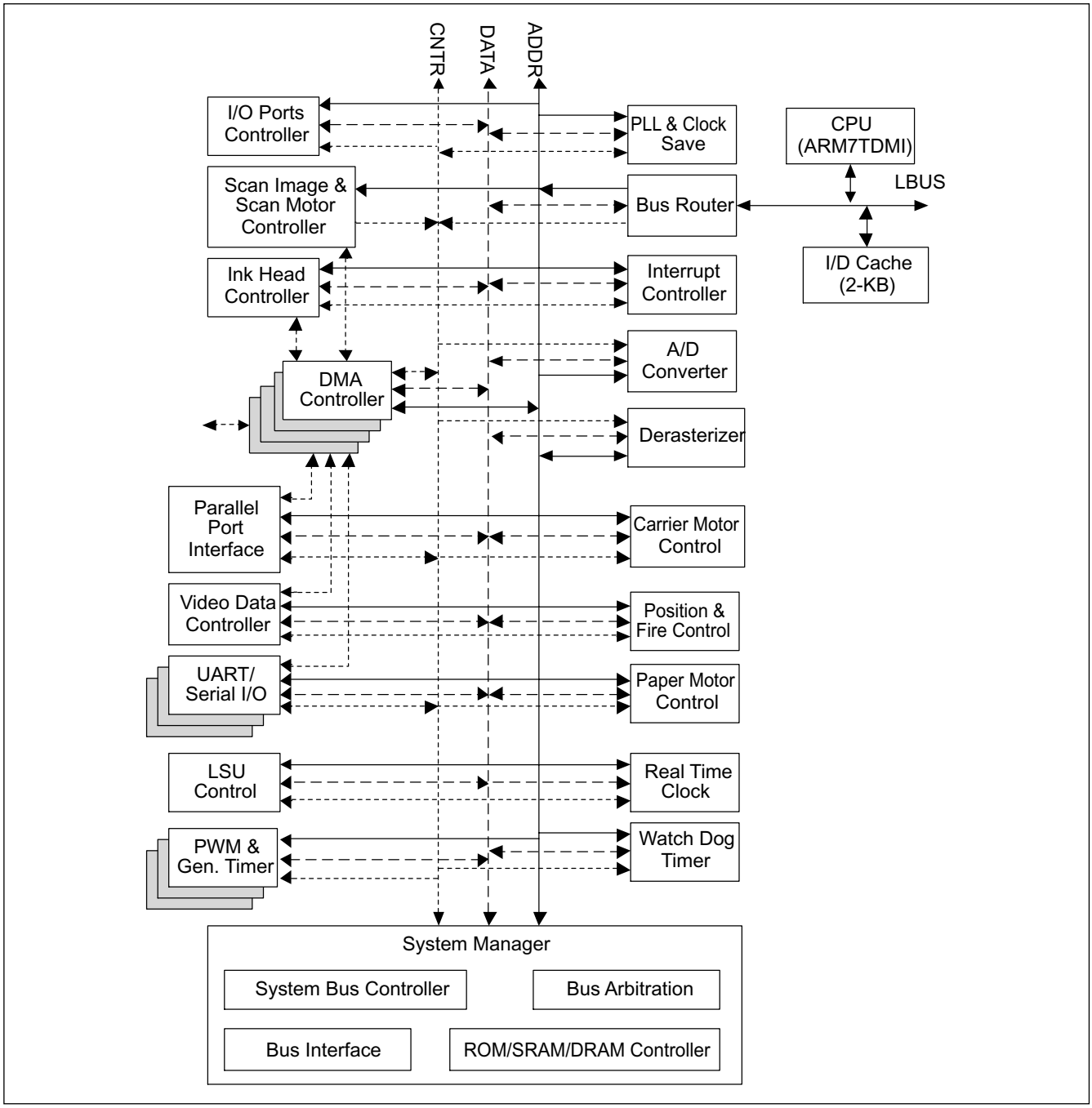


# 4. Circuit Description

## 4-1 Main PBA

### 4-1-1 Summary

The main circuit that consists of CPU, MFP controller including various I/O device drivers, system memory, scanner, printer, motor driver, PC I/F, and FAX transceiver controls the whole system. The entire structure of the main circuit is as follows:



## 4-1-2 Circuit Operation

• CLOCK

1) System Clock
   Device Oscillator
   Frequency 9.500132 MHz
   KS32C65100 RISC PROCESSOR: drives PLL internally and uses 37.17 MHz.

2) Video Clock
   Device Oscillator
   Frequency 28.7448 MHz

3) USB Clock
   Device Oscillator
   Frequency 48 MHz±%

## • KS32C65100 MICROPROCESSOR

1) KS32C65100 MICROPROCESSOR PIN & INTERFACE

| Signal | Pin No. | I/O Type | Description |
|---|---|---|---|
| OSCI | 184 | I7 | KS32C65100 master clock input. |
| OSCO | 185 | O7 | KS32C65100 master clock output. |
| PLL_FILTER | 183 | I5 | PLL filter |
| nRESET | 182 | I4 | Not reset. nRESET is the global reset input for the KS32C65100. For a system reset, nRESET must be held to low level for at least 65 machine cycles. |
| nSLCTIN/GIP[16] | 152 | I1 | Not select information. This input signal is used by parallel port interface to request 'on-line' status information. |
| nSTROBE | 151 | I1 | Not strobe. The nSTROBE input indicates when valid data is on parallel port data bus, PPD[7:0] |
| nAUTOFD/GIP[17] | 154 | I1 | Not auto feed. The nAUTOFD input indicates whether data on the parallel port data bus, PPD[7:0], is an auto feed command. Otherwise, the bus signals are interpreted as data only. |
| nINIT/GIP[15] | 153 | I1 | Not initialization. The nINIT input signal initializes the parallel port's input control. |
| nACK | 159 | I1 | Not parallel port acknowledge. The nACK output signal is issued whenever a transfer on the parallel port data bus is completed. |
| BUSY | 158 | O1 | Parallel port busy. The BUSY output signal indicates that the KS32C65100 parallel port is currently busy. |
| SELECT | 156 | O1 | Parallel port select. The SELECT output signal indicates whether the device connected to the KS32C65100 parallel port is 'on-line' or 'off-line'. |
| PERROR | 157 | O1 | Parallel port paper error. PERROR output indicates that a problem exists with the paper in the ink-jet printer. It could indicate that the printer has a paper jam or that the printer is out of paper. |
| nFAULT | 155 | O1 | Not fault. The nFAULT output indicates that an error condition exists with the printer. This signal can be used to indicate that the printer is out of ink or to inform the user that the printer is not turned on. |
| PPD[7:0] | 142~149 | I/O2 | arallel port data bus. This 8-bit, tri-state bus is used to exchange data between the KS32C65100 and an external host(peripheral). |
| SAVRT | 2 | I6 | Top reference voltage for IP ADC |
| SAIN | 3 | I6 | Analog input for IP ADC |
| SAVRB | 4 | I6 | Bottom reference voltage for IP ADC |

| Signal | Pin No. | I/O Type | Description |
|---|---|---|---|
| CIS_CLK | 6 | O1 | CIS shift clock |
| CIS_SI | 7 | O1 | CIS latch signal |
| PHA_IA0 | 164 | O1 | Line feed motor phase signal A |
| PHA_IA1 | 165 | O1 | Line feed motor phase signal AZ |
| PHB_IB0 | 167 | O1 | Line feed motor phase signal B |
| PHB_IB1 | 168 | O1 | Line feed motor phase signal BZ |
| LF_PH0/GOPA[21] | 163 | O1 | Line feed motor control signal 0 |
| LF_PH1/GOPA[22] | 166 | O1 | Line feed motor control signal 1 |
| CR_PHA/GOPA[23] | 110 | O1 | Direction control line for phase A |
| CR_PHB/GOPA[24] | 113 | O1 | Direction control line for phase B |
| CRIA0/GOPA[25] | 109 | O1 | Current control line 0 for phase A |
| CRIA1/GOPA[26] | 111 | O1 | Current control line 1 for phase A |
| CRIB0/GOPA[27] | 112 | O1 | Current control line 0 for phase B |
| CRIB1/GOPA[28] | 114 | O1 | Current control line 1 for phase B |
| CHX/GIP[8] | 116 | I3 | Encode sensor |
| CHY/GIP[9] | 117 | I3 | Encode sensor |
| ADDR[21:0] | 77~80, 82~88, 90~100 | O5 | Address bus. The 22bit address bus, ADDR[21:0], covers the full 4M half-words address range of each ROM/SRAM, DRAM, and external I/O bank |
| DATA[15:0] | 59~66, 68~75 | I/O3 | External bi-directional 16-bit data bus. |
| nRAS[1:0] | 52,53 | O1 | Not row address strobe for DRAM. The KS32C65100 supports up to two DRAM banks. One nRAS output is provided for each bank. |
| nCAS[1:0] | 54,55 | O1 | Not column address strobe for DRAM. The two nCAS outputs indicate the byte selections whenever a DRAM bank is accessed. |
| nOE | 56 | O1 | Not output enable. Whenever a memory access occurs, the nOE output controls the output enable port of the specific memory device. |
| nWE | 57 | O6 | Not write enable. Whenever a memory access occurs, the nWE output controls the write enable port of the specific memory device. |
| nPHGA[13:1]/ GOPB[12:0] | 16~24, 26~29 | O1 | Gate control line for print head. |
| PHOE[16:1]/ GIOP[26:11] | 31~38, 40~47 | I/O1 | Drain control line for print head. |

| Signal | Pin No. | I/O Type | Description |
|---|---|---|---|
| RXD0/GIP[0] | 194 | I1 | Receive data input for the UART0. RXD0 is the UART0 channel's input signal for receiving serial data. |
| RXD1/GIP[1] | 192 | I1 | Receive data input for the UART1. RXD1 is the UART1 channel's input signal for receiving serial data. |
| RXD2/GIP[2] | 190 | I1 | Receive data input for the UART2. RXD2 is the UART2 channel's input signal for receiving serial data. |
| nEINT0/GIP[3] | 8 | I3 | External interrupt request input nEINT0. |
| nEINT1/GIP[4] | 9 | I3 | External interrupt request input nEINT1. |
| nEINT2/GIP[5] | 10 | I3 | External interrupt request input nEINT2. |
| nXDREQ/GIP[6] | 199 | I3 | External DMA request. |
| TXD0/GOPA[0] | 193 | O1 | Transmit data output for the UART0. TXD0 is the UART0 channel's output for transmitting serial data. |
| TXD1/GOPA[1] | 191 | O1 | Transmit data output for the UART1. TXD1 is the UART1 channel's output for transmitting serial data. |
| TXD2/GOPA[2] | 189 | O1 | Transmit data output for the UART2. TXD2 is the UART2 channel's output for transmitting serial data. |
| nXDACK/GOPA[5] | 200 | O1 | External DMA acknowledge. This active low output signal is generated whenever a DMA transfer is completed. |
| TONEOUT/GOPA[3] | 188 | O1 | Tone generator output. |
| nWDTO/GOPA[4] | 187 | P3 | Reset out by watch dog timer. |
| nIOWR/GOPA[10] | 161 | O1 | External output write strobe |
| nIORD/GOPA[9] | 162 | O1 | External output read strobe |
| CLKOUT/GOPA[6] | 180 | O1 | Clock for external chip |
| nECS2/GOPA[8] | 14 | O1 | External memory chip select 2. |
| TCK | 132 | I2 | JTAG TCK interface in MDS mode. |
| TMS | 135 | I2 | JTAG TMS interface in MDS mode. |
| TDI | 133 | I2 | JTAG TDI interface in MDS mode. |
| nTRST | 136 | I2 | JTAG nTRST interface in MDS mode. |
| TDO | 134 | O1 | JTAG TDO interface in MDS mode. |
| GIOP[10:0] | 137~140, 173~179 | I/O4 | General I/O port. |
| TEST0 | 169 | I2 | Test 0 pin. At normal operation this pin must be connected to GND. |
| TEST1 | 170 | I2 | Test 1 pin. At normal operation this pin must be connected to GND. |
| TEST2 | 171 | I2 | Test 2 pin. At normal operation this pin must be connected to GND. |

| Signal | Pin No. | I/O Type | Description |
|---|---|---|---|
| nECS[1:0] | 12,13 | O1 | Not external chip select. Three I/O banks are provided for external memory-mapped I/O operations. Each I/O bank contains up to 4M half-word. The nECS signals indicate that an external I/O bank is selected. |
| nRCS[2] | 51 | O2 | Not ROM/SRAM chip select. The KS32C65100 can access up to three external ROM/SRAM banks. nRCS[0] corresponds to ROM/SRAM bank 0, nRCS[1] to bank 1, and nRCS[2] to bank 2. By controlling the nRCS signals, CPU addresses can be mapped into the physical memory banks. |
| nRCS[1]/GOPA[7] | 50 | O1 | |
| nRCS[0] | 49 | O1 | |
| SC_CONPHA/ GOPA[19] | 102 | O1 | Scan motor control/Bi-phase |
| SC_CONPHB/ GOPA[20] | 105 | O1 | Scan motor control/Bi-phase |
| SC_CUR[3:0] | 103, 104, 106, 107 | O1 | Scan motor bi-current/uni-phase |
| PWMO[2:0]/ GOPA[13:11] | 118~120 | O1 | PWM out signal |
| VDO2/GOPA[29] | 121 | O4 | Video out from PIFC |
| VDO1/GOPA[14] | 122 | O5 | Video out from LSU control |
| LSU_CLK/ GOPA[15] | 123 | O1 | Clock for LSU motor |
| nHSYNC1/GIP[10] | 125 | I1 | HSYNC1 |
| nLREADY/GIP[11] | 126 | I1 | LSU ready |
| nHSYNC2/GIP[12] | 127 | I1 | HSYNC2 |
| VDI/GIP[13] | 128 | I2 | Video data input from RET |
| VCLK/GIP[14] | 129 | I2 | External video clock |
| nEXTWAIT/GIP[7] | 130 | I3 | External wait |
| RTCXIN | 202 | I7 | RTC oscillator clock input. |
| RTCXOUT | 203 | O7 | RTC oscillator clock output. |
| SLED[2:0]/ GOPA[18:16] | 196~198 | O1 | CIS LED signals |
| GAVRT | 205 | I5 | Top reference voltage for general ADC |
| GAIN[2:0] | 206~208 | I5 | Analog inputs for general ADC |
| RTC_VDD | 201 | | RTC VDD. |

| Signal | Pin No. | I/O Type | Description |
|---|---|---|---|
| VDD_PLL | 186 | | PLL power (3.3V). |
| SAVDD | 1 | | Analog power for scan ADC and general ADC (3.3V). |
| SAVSS | 5 | | Scan ADC ground. |
| GAVSS | 204 | | General ADC ground |
| 3VDD | 15, 30, 81, 115, 131, 160 | | 3.3V internal power.<br>Externally connected to the 3.3V regulator. |
| 5VDD | 48, 67, 89, 141, 195 | | 5V I/O power.<br>Externally connected to the VCC board plane. |
| VSS | 11, 25, 39, 58, 76, 101, 108, 124, 150, 172, 181 | | System ground.<br>Externally connected to the ground board plane. |

## 4-1-3 PROGRAM ROM (FLASH MEMORY)

1) DEVICE

| | |
|---|---|
| TYPE No. | AM29F800B |
| CAPACITY | 2 Mbit (512K * 16bit * 2) |

2) PROGRAMMING

| | |
|---|---|
| BEFORE ASS'Y | EPROM PROGRAMMER or PROGRAMMING at the factory |
| AFTER ASS'Y | DOWNLOAD from PC |

## 4-1-4 DRAM CONTROL

1) DEVICE

| | |
|---|---|
| TYPE NO. | K4E641611D-TC50(EDO Type) |
| CAPACITY | 64 Mbit (4M * 16bit) |

2) OPERATING PRINCIPLE

DRAM can either read or write. The data can be stored in the DRAM only when the power is on. It stores data white the CPU processes data. The address to read and write the data is specified by RAS SIGNAL and CAS SIGNAL. DRAMWE*SIGNAL is activated when writing data and DRAMOE*SIGNAL, when reading.

## 4-1-5 Modem and TX-and RX Related Circuits

MODEM

The Conexant™ FM336 modem is a V.34 half-duplex modem that supports Group 3 facsimile send and receive speeds up to 33600 bps using the V.34 half-duplex mode. Using a V.34 technique to optimize modem configuration for line conditions, the modem connects at the optimal selected data rate that the channel can support from 33600 bps to 2400 bps.

The modem can operate over the public switched telephone network (PSTN) through a line terminator provided by a Data Access rrangement (DAA). The modem satisfies the requirements specified inITU-T recommendations V.34, V.17, V.29, V.27 ter, V.23, V.21, and meets the binary signal ingrequirements of V.8 and T.30. Internal HDLC support eliminates the need for an external serial input/output (SIO) device in the DTE for products incorporating error detection and T.30 protocol. The modem can perform HDLC framing per T.30 at all data speeds. CRC generation/checking along with zero insertion/deletion enhances DLC/HDLC frame operations. An FSK flag pattern detector facilitates FSK detection during high speed reception.The modem features a programmable DTMF transmitter/receiver and three programmable tone detectors which operate in the tone mode.

The modem offers lower power consumption and small size to allow the design of compact system enclosures for use in industrial, office, and home environments.The modem is available in a 100-pin PQFP package.

## FM336 FEATURES

- 2-wire half
  - duplex fax modem modes with send and receive data rates up to 33600 bps.
  - V.34, V.17, V.29, V.27 ter, and V.21 channel 2
  - Short train option in V.17 and V.27 ter
- 2-wire full
  - duplex data modem modes
  - V.21, V.23 (75 bps TX/1200 bps RX or 1200 bps TX/ 75 bps RX)
- PSTN session starting
  - V.8 signaling
- HDLC support at all speeds
  - Flag generation, 0 bit stuffing, ITU CRC
  - 16 or CRC
  - 32 calculation and generation
  - Flag detection, 0 bit deletion, ITU CRC
  - 16 or CRC
  - 32 check sum error detection
  - FSK flag pattern detection during high speed receiving
- Tone modes and features
  - Programmable single or dual tone generation
  - DTMF receive
  - Tone detection with three programmable tone detectors
- Serial synchronous data
- Parallel synchronous data
- Automatic Rate Adaptation (ARA) in V.34 Half-Duplex
- TTL and CMOS compatible DTE interface
  - ITU-T V.24 (EIA/TIA-232-E) (data/control)
  - Microprocessor bus (data/configuration/control)
- Receive dynamic range: 0 dBm to –43 dBm for V.17, V.33, V.29, V.27terand V.21, –9 dBm to –43 dBm for V.34 half-duplex
- Programmable RLSD turn-on and turn-off thresholds
- Programmable transmit level: 0 to -15 dBm
- Adjustable speaker output to monitor received signal
- DMA support interrupt lines
- Two 16-byte FIFO data buffers for burst data transfer with extension up to 255 bytes
- NRZI encoding/decoding
- Diagnostic capability
- +3.3V operation with +5V tolerant inputs
- +5V analog signal interface
- Typical power consumption:- Sleep mode: 20 mW
  - Normal mode: 250 mWa
- 100-pin PQFP package

## Signaling Rates, and Data Rates

| Configuration | Modulation1 | Carrier Frequency (Hz) –0.01% | Data Rate (bps) –0.01% | Symbol Rate (Symbols/Sec.) | Bits/Symbol - Data | Bits/Symbol - TCM | Constellation Points |
|---|---|---|---|---|---|---|---|
| V.34 33600 TCM | TCM | Note 2 | 33600 | 3429 only | Note 2 | Note 2 | Note 2 |
| V.34 31200 TCM | TCM | Note 2 | 31200 | 3200 min | Note 2 | Note 2 | Note 2 |
| V.34 28800 TCM | TCM | Note 2 | 28800 | 3000 min | Note 2 | Note 2 | Note 2 |
| V.34 26400 TCM | TCM | Note 2 | 26400 | 2800 min | Note 2 | Note 2 | Note 2 |
| V.34 24000 TCM | TCM | Note 2 | 24000 | 2800 min | Note 2 | Note 2 | Note 2 |
| V.34 21600 TCM | TCM | Note 2 | 21600 | 2400 min | Note 2 | Note 2 | Note 2 |
| V.34 19200 TCM | TCM | Note 2 | 19200 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 16800 TCM | TCM | Note 2 | 16800 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 14400 TCM | TCM | Note 2 | 14400 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 12000 TCM | TCM | Note 2 | 12000 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 9600 TCM | TCM | Note 2 | 9600 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 7200 TCM | TCM | Note 2 | 7200 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 4800 TCM | TCM | Note 2 | 4800 | 2400 to 3429 | Note 2 | Note 2 | Note 2 |
| V.34 2400 TCM | TCM | Note 2 | 2400 | 2400 only | Note 2 | Note 2 | Note 2 |
| V.23 1200/75 | FSK | 1700/420 | 1200/75 | 1200 | 1 | 0 | — |
| V.21 | FSK | 1080/1750 | Up to300 | 300 | 1 | 0 | — |
| V.17 14400 TCM | TCM | 1800 | 14400 | 2400 | 6 | 1 | 128 |
| V.17 12000 TCM | TCM | 1800 | 12000 | 2400 | 5 | 1 | 64 |
| V.17 9600 TCM | TCM | 1800 | 9600 | 2400 | 4 | 1 | 32 |
| V.17 7200 TCM | TCM | 1800 | 7200 | 2400 | 3 | 1 | 16 |
| V.29 9600 | QAM | 1700 | 9600 | 2400 | 4 | 0 | 16 |
| V.29 7200 | QAM | 1700 | 7200 | 2400 | 3 | 0 | 8 |
| V.29 4800 | QAM | 1700 | 4800 | 2400 | 2 | 0 | 4 |
| V.27 ter 4800 | DPSK | 1800 | 4800 | 1600 | 3 | 0 | 8 |
| V.27 ter 2400 | DPSK | 1800 | 2400 | 1200 | 2 | 0 | 4 |
| V.21 Channel 2 | FSK | 1750 | 300 | 300 | 1 | 0 | — |

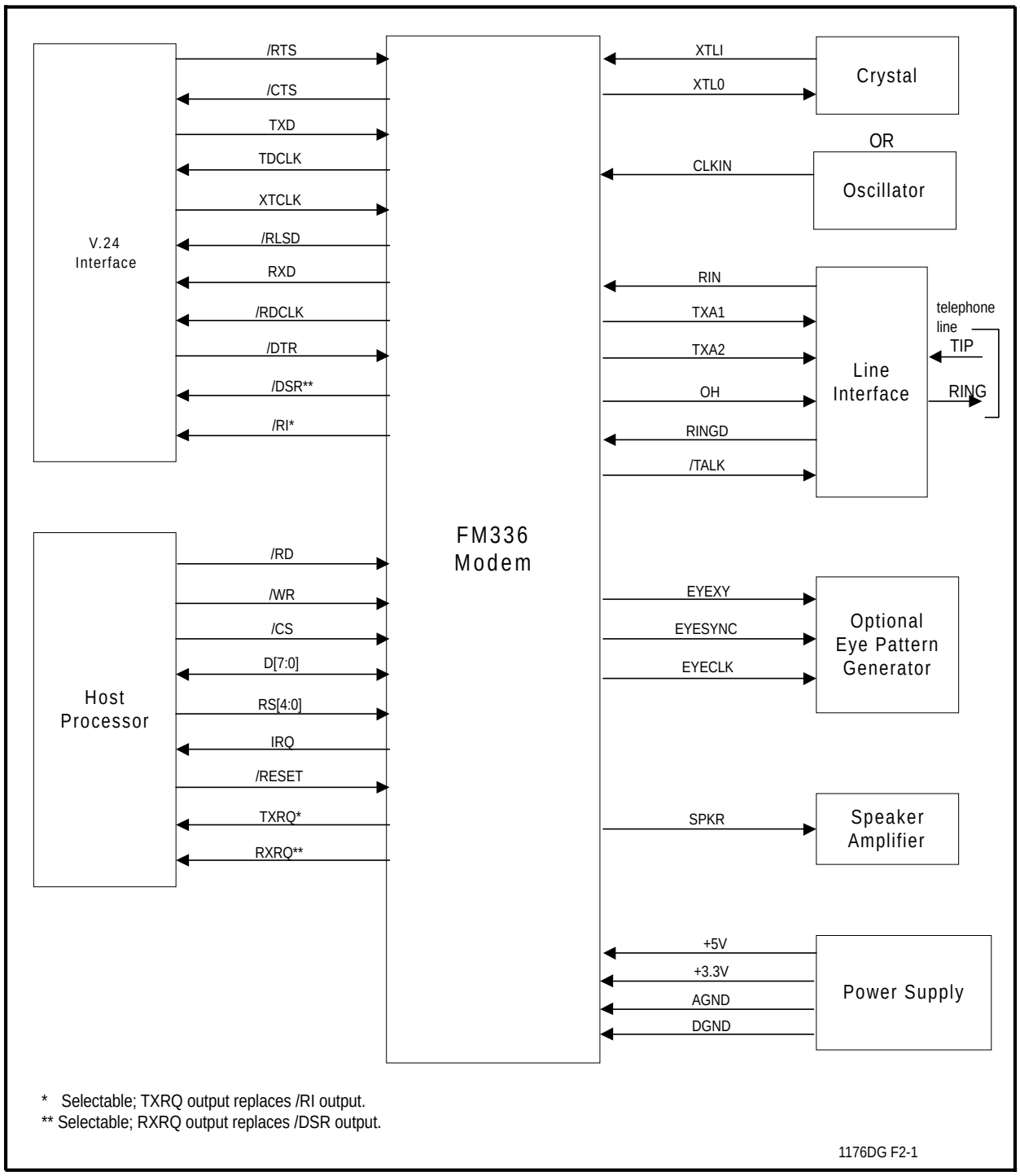
**Notes:**

1. Modulation legend: TCM:Trellis-Coded Modulation QAM: Quadrature Amplitude Modulation
   FSK:Frequency Shift Keying DPSK: Differential Phase Shift Keying

2. Adaptive; established during handshake:

| | Carrier Frequency (Hz) | |
|---|---|---|
| Symbol Rate (Baud) | V.34 Low Carrier | V.34 High Carrier |
| 2400 | 1600 | 1800 |
| 2800 | 1680 | 1867 |
| 3000 | 1800 | 2000 |
| 3200 | 1829 | 1920 |
| 3429 | 1959 | 1959 |

## Modem Functions Interface Signals



## FM336 Pin Signals

| Pin | Signal Label | I/O Type 1 | Interface 3 | Pin | Signal Label | I/O Type 1 | Interface 3 |
|---|---|---|---|---|---|---|---|
| 1 | RESERVED | - | - | 51 | RESERVED | - | - |
| 2 | RS2 | IA | HOST Interface | 52 | VSUB | GND | - |
| 3 | RS3 | IA | HOST Interface | 53 | VSS | GND | - |
| 4 | RS4 | IA | HOST Interface | 54 | NC | - | NC |
| 5 | /CS | IA | HOST Interface | 55 | NC | - | NC |
| 6 | /WR | IA | HOST Interface | 56 | Sleep | MI | Modem Interconnect |
| 7 | /RD | IA | HOST Interface | 57 | VDD1 | PWR | - |
| 8 | /RDCLK | OA | DTE Serial Interface | 58 | RESERVED | - | - |
| 9 | /RLSD | OA | DTE Serial Interface | 59 | RESERVED | - | - |
| 10 | TDCLK | OA | DTE Serial Interface | 60 | NC | - | NC |
| 11 | TXD | IA | DTE Serial Interface | 61 | SR1IO | MI | Modem Interconnect |
| 12 | /CTS | OA | DTE Serial Interface | 62 | VCORE | PWR | - |
| 13 | VDD1 | PWR | - | 63 | VDD1 | PWR | - |
| 14 | RESERVED | - | - | 64 | XTCLK | IA | DTE Serial Interface |
| 15 | RESERVED | - | - | 65 | VSS | GND | - |
| 16 | VSS | GND | - | 66 | RESERVED | - | - |
| 17 | NC | - | NC | 67 | RXD | OA | DTE Serial Interface |
| 18 | /RESET | OA | Modem Interconnect | 68 | /DTR | IA | DTE Serial Interface |
| 19 | SR4OUT | OA | Modem Interconnect | 69 | VDD1 | PWR | - |
| 20 | NC | - | NC | 70 | IA_SLEEP | MI | Modem Interconnect |
| 21 | SR4IN | IA | Modem Interconnect | 71 | VGG | PWR | - |
| 22 | CLK_OUT | OA | Modem Interconnect | 72 | YCLK | OA | Overhead Signal |
| 23 | EYESYNC | OA | Diagnostic Signal | 73 | XCLK | OA | Overhead Signal |
| 24 | EYECLK | OA | Diagnostic Signal | 74 | EYEXY | OA | Diagnostic Signal |
| 25 | MAVSS | GND | - | 75 | /DSR | OA | DTE Serial Interface |
| 26 | MAVDD | PWR | - | 76 | /RI | OA | Telephone Line Interface |
| 27 | SPKR | O(DF) | Telephone Line Interface | 77 | RINGD | IA | Telephone Line Interface |
| 28 | TXA2 | O(DD) | Telephone Line Interface | 78 | /RTS | IA | DTE Serial Interface |
| 29 | TXA1 | O(DD) | Telephone Line Interface | 79 | IRQ | OA | HOST Interface |
| 30 | VREF | MI | Modem Interconnect | 80 | VSS | GND | - |
| 31 | VC | MI | Modem Interconnect | 81 | GPO0 | MI | Modem Interconnect |
| 32 | RIN | I(DA) | Telephone Line Interface | 82 | RESERVED | - | - |
| 33 | MAVSS | AGND | - | 83 | RESERVED | - | - |
| 34 | /POR | IA | Modem Interconnect | 84 | VDD1 | PWR | - |
| 35 | RESERVED | - | - | 85 | XTALI/CLKIN | I | Overhead Signal |
| 36 | RESERVED | - | - | 86 | XTALO | O | Overhead Signal |
| 37 | /TALK | O(DD) | Telephone Line Interface | 87 | D0 | IA/OB | HOST Interface |
| 38 | VDD | PWR | - | 88 | D1 | IA/OB | HOST Interface |
| 39 | RESERVED | - | - | 89 | D2 | IA/OB | HOST Interface |
| 40 | RESERVED | - | - | 90 | D3 | IA/OB | HOST Interface |
| 41 | NC | - | NC | 91 | D4 | IA/OB | HOST Interface |
| 42 | M_CNTRL_SIN | IA | Modem Interconnect | 92 | VDD1 | PWR | - |
| 43 | M_CLKIN | IA | Modem Interconnect | 93 | D5 | IA/OB | HOST Interface |
| 44 | M_TXSIN | IA | Modem Interconnect | 94 | D6 | IA/OB | HOST Interface |
| 45 | M_SCK | IA | Modem Interconnect | 95 | D7 | IA/OB | HOST Interface |
| 46 | M_RXOUT | IA | Modem Interconnect | 96 | RS0 | IA/OB | HOST Interface |
| 47 | M_STROBE | IA | Modem Interconnect | 97 | RS1 | IA/OB | HOST Interface |
| 48 | RESERVED | - | - | 98 | PLL_VDD | PWR | - |
| 49 | OH | O(DD) | Telephone Line Interface | 99 | VSS | GND | - |
| 50 | VDD | PWR | - | 100 | PLL_GND | GND | - |

**Notes:**

1. I/O types:
   - MI = Modem interconnect.
   - IA, IB = Digital input.
   - OA, OB = Digital output.
   - I(DA) = Analog input.
   - O(DD), O(DF) = Analog output.
2. NC = No external connection required.
   RESERVED = No external connection allowed.
3. Interface Legend:
   - HOST = Modem Control Unit (Host)
   - DTE = Data Terminal Equipment

## FM336 Signals Definitions

| Label | I/O Type | Signal Name/Description |
|---|---|---|
| **TELEPHONE LINE INTERFACE/AUXILIARY** | | |
| TXA1, TXA2 | O(DD) | **Transmit Analog 1 and 2.** The TXA1 and TXA2 outputs are differential outputs 180 degrees out of phase with each other. Each output can drive a 300 load. |
| RIN | O(DA) | **Receive Analog.** RIN is a single-ended receive data input from the telephone line interface or an optional external hybrid circuit. |
| RINGD | IA | **Ring Detect.** The RINGD input is monitored for pulses in the range of 15 Hz to 68 Hz. The frequency detection range may be changed by the host in DSP RAM. The circuit driving RINGD should be a 4N35 optoisolator or equivalent. The circuit driving RINGD should not respond to momentary bursts of ringing less than 125 ms in duration, or less than 40 VRMS (15 Hz to 68 Hz) across TIP and RING. Detected ring signals are reflected on the /RI output signal as well as the RI bit. |
| /TALK | O(DD) | **Relay B Control.** The /TALK open collector output can directly drive a +5V reed relay coil with a minimum resistance of 360 ohms (13.9 mA max. @ 5.0V) and a must-operate voltage no greater than 4.0 VDC. A clamp diode, such as a 1N4148, should be installed across the relay coil. An external transistor can be used to drive heavier loads (electro-mechanical relays). /TALK is controlled by host setting/resetting of the RB bit.<br>In a typical application, /TALK is connected to the normally closed Talk/Data relay (/TALK). In this case, /TALK active opens the relay to disconnect the handset from the telephone line. |
| OH | O(DD) | **Relay A Control.** The OH open collector output can directly drive a +5V reed relay coil with a minimum resistance of 360 ohms (13.9 mA max. @ 5.0V) and a must-operate voltage no greater than 4.0 VDC. A clamp diode, such as a 1N4148, should be installed across the relay coil. An external transistor can be used to drive heavier loads (electro-mechanical relays). OH is controlled by host setting/resetting of the RA bit.<br>In a typical application, OH is connected to the normally open Off-Hook relay (OHRC). In this case, OH active closes the relay to connect the modem to the telephone line.<br>Alternatively, in a typical application, OH is connected to the normally open Caller ID relay (CALLID). When the modem detects a Calling Number Delivery (CND) message, the OH output is asserted to close the CALLID relay in order to AC couple the CND information to the modem RIN input (without closing the off-hook relay and allowing loop current flow which would indicate an off-hook condition). |
| /RI | OA | **Ring Indicator.** /RI output follows the ringing signal present on the line with a low level (0 V) during the ON time, and a high level (+3.3 V) during the OFF time coincident with the ringing signal. The RI status bit reflects the state of the /RI output. |
| **DIAGNOSTIC SIGNALS** | | |
| | | Three signals provide the timing and data necessary to create an oscilloscope quadrature eye pattern. The eye pattern is a display of received baseband constellation. By observing this constellation, common line disturbances can usually be identified. |
| EYEXY | OA | **Serial Eye Pattern X/Y Output.** EYEXY is a serial output containing two 11-bit diagnostic words (EYEX and EYEY) for display on the oscilloscope X axis (EYEX) and Y axis (EYEY). EYEX is the first word clocked out; EYEY follows. Each word has 8-bits of significance. EYEXY is clocked by the rising edge of EYECLK. This serial digital data must be converted to parallel digital form by a serial-to-parallel converter, and then to analog form by two digital-to-analog (D/A) converters. |
| EYECLK | OA | **Serial Eye Pattern Clock.** EYECLK is a 336 kHz output clock for use by the serial-to-parallel converters. The low-to-high transitions of RDCLK coincide with the low-to-high transitions of EYECLK. EYECLK, therefore, can be used as a receiver multiplexer clock. |
| EYESYNC | OA | **Serial Eye Pattern Strobe.** EYESYNC is a strobe for loading the D/A converters. |
| **SPEAKER INTERFACE** | | |
| SPKR | O(DF) | **Speaker Analog Output.** The SPKR output reflects the received analog input signal. The SPKR on/off and three levels of attenuation are controlled by bits in DSP RAM. When the speaker is turned off, the SPKR output is clamped to the voltage at the VC pin. The SPKR output can drive an impedance as low as 300 ohms. In a typical application, the SPKR output is an input to an external LM386 audio power amplifier. |

## FM336 Signals Definitions (Cont'd)

| Label | I/O Type | Signal Name/Description |
|---|---|---|
| **REFERENCE SIGNALS AND MODEM INTERCONNECT** | | |
| VC | MI | **Low Voltage Reference.** Connect to analog ground through 10 µF (polarized, + terminal to VC) and 0.1 µF (ceramic) in parallel. |
| VREF | MI | **High Voltage Reference.** Connect to VC through 10 µF (polarized, + terminal to VREF) and 0.1 µF (ceramic) in parallel. |
| /POR | IA | **Power-On-Reset.** Connects to /RESET. |
| /RESET | OA | **Reset.** Connects to /POR. |
| CLK_OUT | MI | **IA Clock.** Connect to M_CLKIN. |
| SR4OUT | OA | **SR4OUT.** Connect to M_TXSIN. |
| SR4IN | IA | **SR4IN.** Connect to M_RXOUT. |
| SR1IO | OA | **SR1IO.** Connect to M_CNTRL_SIN. |
| M_CNTRL_SIN | IA | **M_CNTRL_SIN.** Connect to SR1IO. |
| M_CLKIN | IA | **M_CLKIN.** Connect to CLK_OUT. |
| M_TXSIN | IA | **M_TXSIN.** Connect to SR4OUT. |
| M_SCK | IA | **M_SCK.** Connect to EYECLK. |
| M_RXOUT | IA | **M_RXOUT.** Connect to SR4IN. |
| M_STROBE | IA | **M_STROBE.** Connect to EYESYNC. |
| SLEEP | MI | **SLEEP.** Connect to IA_SLEEP. |
| IA_SLEEP | MI | **IA_SLEEP.** Connect to SLEEP |
| GPO0 | MI | **GPO0.** Connect to /RDCLK. |
| **DTE SERIAL INTERFACE** | | |
| /RDCLK | OA | **Receive Data Clock.** The modem outputs a synchronous Receive Data Clock (/RDCLK) for USRT timing. The /RDCLK frequency is the data rate (±0.01%) with a duty cycle of 50 ±1%. The /RDCLK low-to-high transitions coincide with the center of the received data bits. |
| /RLSD | OA | **Received Line Signal Detector.** For V.17, V.33, V.29, and V.27 ter; RLSD goes active at the end of the training sequence. If energy is above the turn-on threshold and training is not detected, the /RLSD off-to-on response time is 816 baud times for V.17/V.33, V.29, and V.27 ter long train; 492 baud times for V.17/V.33; and 486 baud times for V.27 ter short train. The /RLSD on-to-off time is 40 ± 5 ms for V.17/V.33, 35 ± 5 ms for V.29 or 11.6 ± 5 ms for V.27 ter. The /RLSD on-to-off time ensures that all valid data bits have appeared on RXD.<br>The /RLSD programmable threshold levels default to –43 dBm for off-to-on and to –48 dBm for on-to-off. A minimum hysteresis of 2 dBm exists between the actual off-to-on and on-to-off transition levels. The threshold level and hysteresis are measured with an unmodulated 2100 Hz tone applied to the Receiver Analog (RXA) input.<br>**Note:** Performance may be degraded when the received signal level is less than –43 dBm. |
| TDCLK | OA | **Data Clock.** The modem outputs a synchronous Data Clock (DCLK) for USRT timing. The DCLK frequency is the data rate (±0.01%) with a duty cycle of 50 ±1%. The DCLK low-to-high transitions coincide with the center of the data bits. Transmit Data (TXD) must be stable during the one microsecond period immediately preceding the rising edge of DCLK and following the rising edge of DCLK. |
| TXD | IA | **Transmit Data.** The modem obtains serial data to be transmitted from the local DTE on the Transmit Data (TXD) input in serial data mode (TPDM bit = 0), or from the interface memory Transmit Data Register (TBUFFER) in parallel data mode (TPDM bit = 1). |

## FM336 Signals Definitions (Cont'd)

<table>
<tr><th>Label</th><th>I/O Type</th><th>Signal Name/Description</th></tr>
<tr><td>/CTS</td><td>OA</td><td>Clear To Send. /CTS active indicates to the local DTE that the modem will transmit any data present on TXD. /CTS response times from an active condition of /RTS are shown in Table 1-3.</td></tr>
<tr><td>XTCLK</td><td>IA</td><td>External Transmit Clock. In synchronous communication, an external transmit data clock can be connected to the modem XTCLK input. The clock supplied at XTCLK must exhibit the same characteristics as TDCLK. The XTCLK input is then reflected at the TDCLK output.</td></tr>
<tr><td>RXD</td><td>OA</td><td>Received Data. The modem presents received serial data to the local DTE on the Received Data (RXD) output and to the interface memory Receive Data Register (DBUFFER) in parallel data mode.</td></tr>
<tr><td>/DTR</td><td>IA</td><td>Data Terminal Ready. In V.8 and V.34 configuration, activating /DTR initiates the handshake sequence. The DATA bit must be set to complete the handshake.<br>In V.21 or V.23 configuration, activating /DTR causes the modem to enter the data state provided that the DATA bit is a 1. If in answer mode, the modem immediately sends answer tone. During the data mode, deactivating /DTR causes the transmitter and receiver to turn off and return to the idle state.<br>The /DTR input and the /DTR control bit are logically ORed.</td></tr>
<tr><td>/DSR</td><td>OA</td><td>Data Set Ready. DSR ON indicates that the modem is in the data transfer state. DSR OFF indicates that the DTE is to disregard all signals appearing on the interchange circuits except Ring Indicator (/RI). /DSR is OFF when the modem is in a test mode (local analog or remote digital loopback). The /DSR status bit reflects the state of the /DSR output.</td></tr>
<tr><td>/RTS</td><td>IA</td><td>Request to Send. The active low /RTS input allows the modem to transmit data present at TXD in the serial data mode (TPDM bit = 0), or in DBUFFER in the parallel data mode (TPDM bit = 1), when /CTS becomes active.<br>The /RTS hardware control input is logically ORed with the /RTSP bit by the modem to form the resultant control signal.</td></tr>
<tr><td colspan="3">HOST INTERFACE</td></tr>
<tr><td>/CS</td><td>IA</td><td>Chip Select. The active low /CS input selects and enables the modem DSP for parallel data transfer between the DSP and the host over the microprocessor bus.</td></tr>
<tr><td>/WR</td><td>IA</td><td>Write. Writing is controlled by the host pulsing /WR input low during the microprocessor bus access cycle. The write timing is:
<table>
<tr><th>Parameter</th><th>Symbol</th><th>Min.</th><th>Max.</th><th>Units</th></tr>
<tr><td>CS Setup Time</td><td>TCS</td><td>0</td><td>–</td><td>ns</td></tr>
<tr><td>RSi Setup Time</td><td>TRS</td><td>10</td><td>–</td><td>ns</td></tr>
<tr><td>Control Hold Time</td><td>THC</td><td>10</td><td>–</td><td>ns</td></tr>
<tr><td>Write Data Setup Time</td><td>TWDS</td><td>20</td><td>–</td><td>ns</td></tr>
<tr><td>Write Data Hold Time</td><td>TDHW</td><td>10</td><td>–</td><td>ns</td></tr>
</table>
Note: A read or write operation following a write operation must be delayed by at least 4 XCLK cycles.</td></tr>
<tr><td>/RD</td><td>IA</td><td>Read Enable. Reading is controlled by the host pulsing /RD input low during the microprocessor bus access cycle. The read timing is:
<table>
<tr><th>Parameter</th><th>Symbol</th><th>Min.</th><th>Max.</th><th>Units</th></tr>
<tr><td>CS Setup Time</td><td>TCS</td><td>0</td><td>–</td><td>ns</td></tr>
<tr><td>RSi Setup Time</td><td>TRS</td><td>10</td><td>–</td><td>ns</td></tr>
<tr><td>Data Access Time</td><td>TDA</td><td>–</td><td>45</td><td>ns</td></tr>
<tr><td>Data Hold Time</td><td>TDHR</td><td>10</td><td>–</td><td>ns</td></tr>
<tr><td>Control Hold Time</td><td>THC</td><td>10</td><td>–</td><td>ns</td></tr>
</table>
Notes:<br>1. /CS and /RD must not both be continuously active.<br>A read or write operation following a read operation must be delayed by at least 2 XCLK cycle.</td></tr>
</table>

## FM336 Signals Definitions (Cont'd)

| Label | I/O Type | Signal Name/Description |
|---|---|---|
| IRQ | OA | **Interrupt Request.** Interrupt request outputs may be connected to the host processor interrupt request input in order to interrupt host program execution for immediate modem service. The IRQ output can be enabled in DSP interface memory to indicate immediate change of conditions in the modem. The use of IRQ is optional depending upon modem application.<br>The IRQ output structure is an open-drain field-effect-transistor (FET). The IRQ output can be wire-ORed with other IRQ lines in the application system. Any of these sources can drive the host interrupt input low, and the host interrupt servicing process normally continues until all interrupt requests have been serviced (all IRQ lines have returned high).<br>Because of the open-drain structure of IRQ#, an external pull-up resistor to +3.3V is required at some point on the IRQ line. The resistor value should be small enough to pull the IRQ line high when all IRQ drivers are off (it must overcome the leakage currents). The resistor value should be large enough to limit the driver sink current to a level acceptable to each driver. If only the modem IRQ# output is used, a resistor value of 5.6K ohms, 20%, 0.25 W, is sufficient. |
| D0-D7 | IA/OB | **Data Lines.** Eight bi-directional data lines (D0–D7) provide parallel transfer of data between the host and the modem. The most significant bit is D7. Data direction is controlled by the Read Enable (READ#-ø2) and Write Enable (WRITE#-R/W#) signals.<br>During a read cycle, data from the DSP interface memory register is gated onto the data bus via three-state drivers in the DSP. These drivers force the data lines high for a one bit, or low for a zero bit. When not read, the three-state drivers assume their high-impedance (off) state.<br>During a write cycle, data from the data bus is copied into the selected DSP interface memory register, with high and low bus levels representing one and zero bit states, respectively. |
| RS0-RS4 | IA/OB | **Register Select Lines.** Five active high Register Select inputs (RS0–RS4) address interface memory registers within the DSP when /CS is low. These lines are typically connected to address lines A0-A4.<br>When selected by /CS low, the DSP decodes RS0 through RS4 to address one of 32 8-bit internal interface memory registers (00-1F). The most significant address bit is RS4 while the least significant address bit is RS0. The selected register can be read from, or written into, via the 8-bit parallel data bus (D0–D7). |
| **OVERHEAD SIGNALS** | | |
| VDD1 | PWR | 3.3V Supply Voltage for DSP Digital Circuits. |
| VSS | DGND | Digital ground. |
| VGG | PWR | 5V Supply Voltage for DSP Digital Circuits. |
| MAVSS | AGND | Analog ground. |
| MAVDD | PWR | 5V Supply Voltage for IA Analog Circuits. |
| VDD | PWR | 5V Supply Voltage for IA Digital Circuits. |
| VSUB | GND | Connect to analog ground. |
| XCLK | OA | **XCLK Output.** Output clock at 63.5045 MHz, which runs during normal operational mode and turned off during Sleep Mode. |
| YCLK | OA | **YCLK.** Output clock at 28.224 MHz, which runs during normal operational mode and turned off during Sleep Mode.. |
| **Label** | **I/O Type** | **Signal Name/Description** |
| XTALI/CLKIN | I/O | **Crystal In/Clock In.** Connect to an external 28.224 MHz crystal circuit or an external 28.224 MHz oscillator circuit.<br>**Label** **Crystal** **Oscillator**<br>XTALI/CLKIN XTALI CLKIN |
| XTALO/NC | I/O | **Crystal Out/NC.** Connect to the external crystal circuit return or leave open.<br>**Label** **Crystal** **Oscillator**<br>XTALO/NC XTALO NC |
| PLL_VDD | PWR | PLL Supply Voltage. |
| PLL_GND | DGND | PLL Supply Voltage return. |
| VCORE | PWR | 3.3V Supply Voltage. Connect to VDD1. |
| RESERVED | - | Reserved pins are used for future development and should not be connected to any circuitry. |

## 4-1-6 Scanner Part

### CIS DRIVER, INPUT PROCESSOR

CIS contacl signal is consist of BLED, RLED, GLED, CIS_CLK CIS_SI. CIS driver power supply is +5v, LED driver power supply is +5v also. As CIS input signal, minc-Vref values O, MAXC+Vref Values is about 1.2V.

### SPECIFICATION

| | |
|---|---|
| Readable width | 216mm |
| Number of sensor elements | 2552 dots(21~2572 dots available) |
| Resolution | 75 ms/line |
| Scanning speed | 7.5 ms/line |
| Light source | Color LEDs |
| | Red (640 mm) |
| | Green(525mm) |
| | Blue(470mm) |
| Data output | 1 analogue |
| Outward dimension(WXHXL) | 18.0 X 12.2 X 231.0 mm (attachment) |

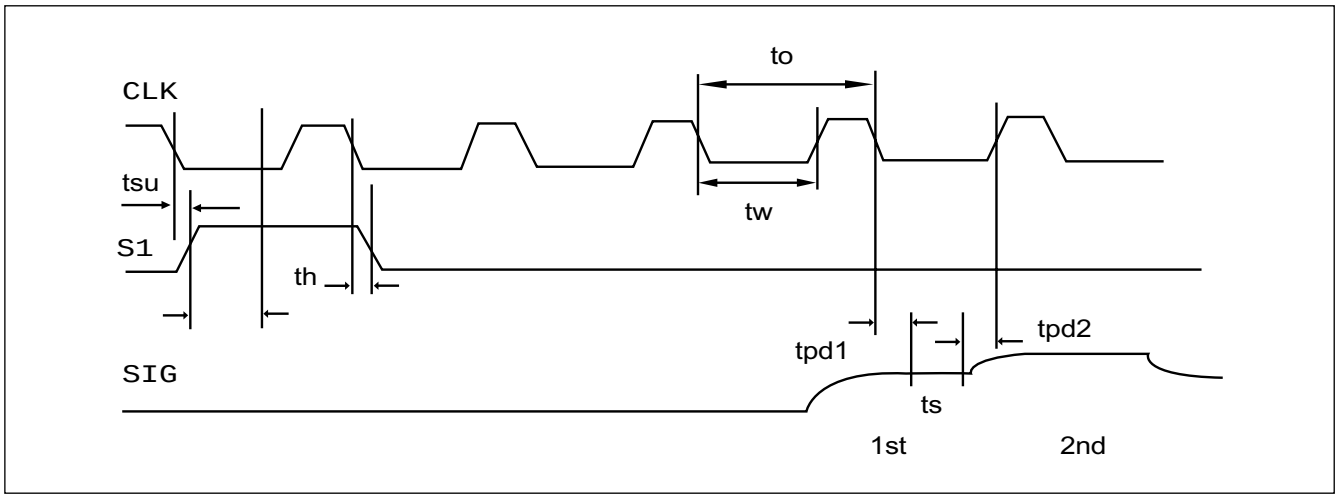
### PIN FUNCTION DESCRIPTION

| No. | Signature | Name | Description |
|---|---|---|---|
| 1 | SIG | signal output | Video output signal |
| 2 | GND | Ground | 0V DC ; reference point |
| 3 | VDD | Supply voltage | +5V DC supply (ref. to GND) |
| 4 | GND | Ground | 0V DC ; reference point |
| 5 | GND | Ground | 0V DC ; reference point |
| 6 | SI | Start pulse | Start pulse |
| 7 | GND | Ground | 0V DC ; reference point |
| 8 | CLK | Clock | CIS main clock |
| 9 | LEDB | LED Ground (blue) | LED POWER SUPPLY BLUE |
| 10 | LEDG | LED Ground (green) | LED POWER SUPPLY GREEN |
| 11 | LEDR | LED Ground (red) | LED POWER SUPPLY RED |
| 12 | VLED | Supply voltage | LED POWER SUPPLY |

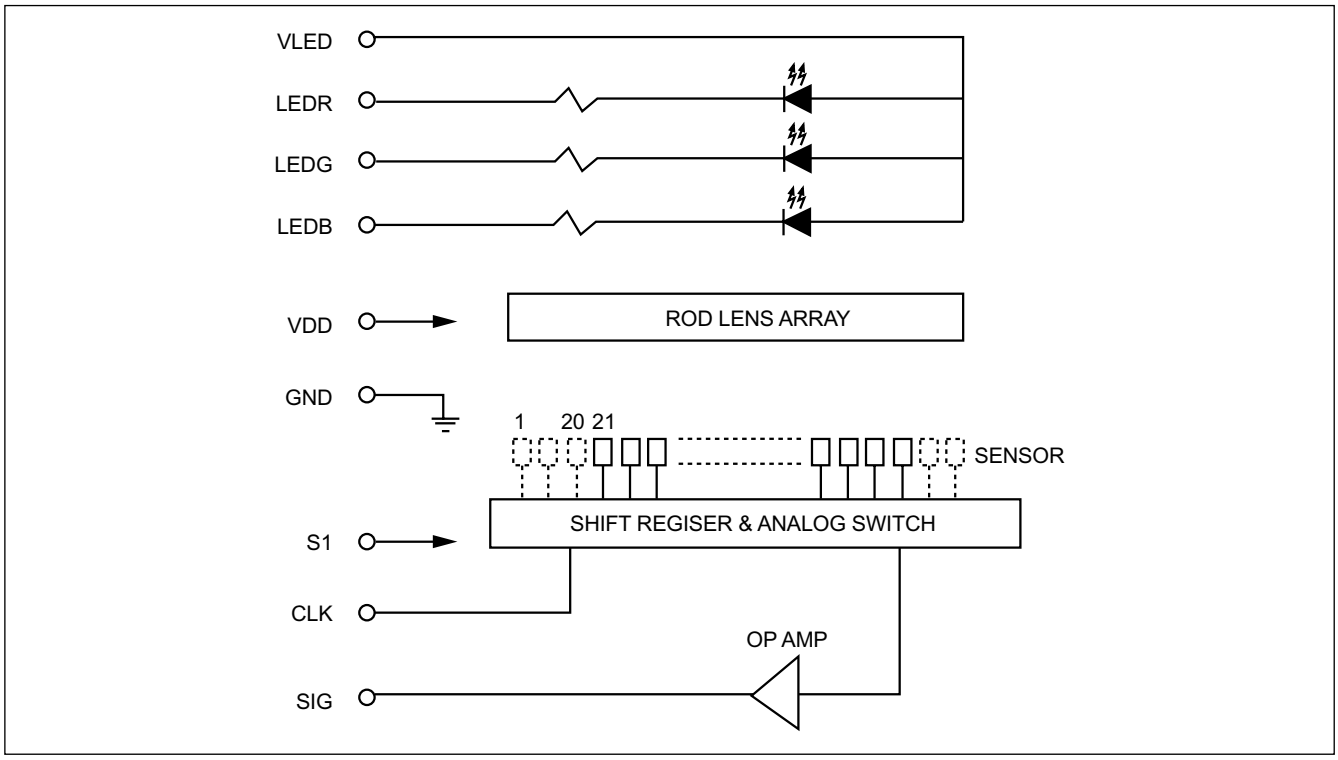
## ELECTRICAL CHARACTERISTICS (TA=25˚C)

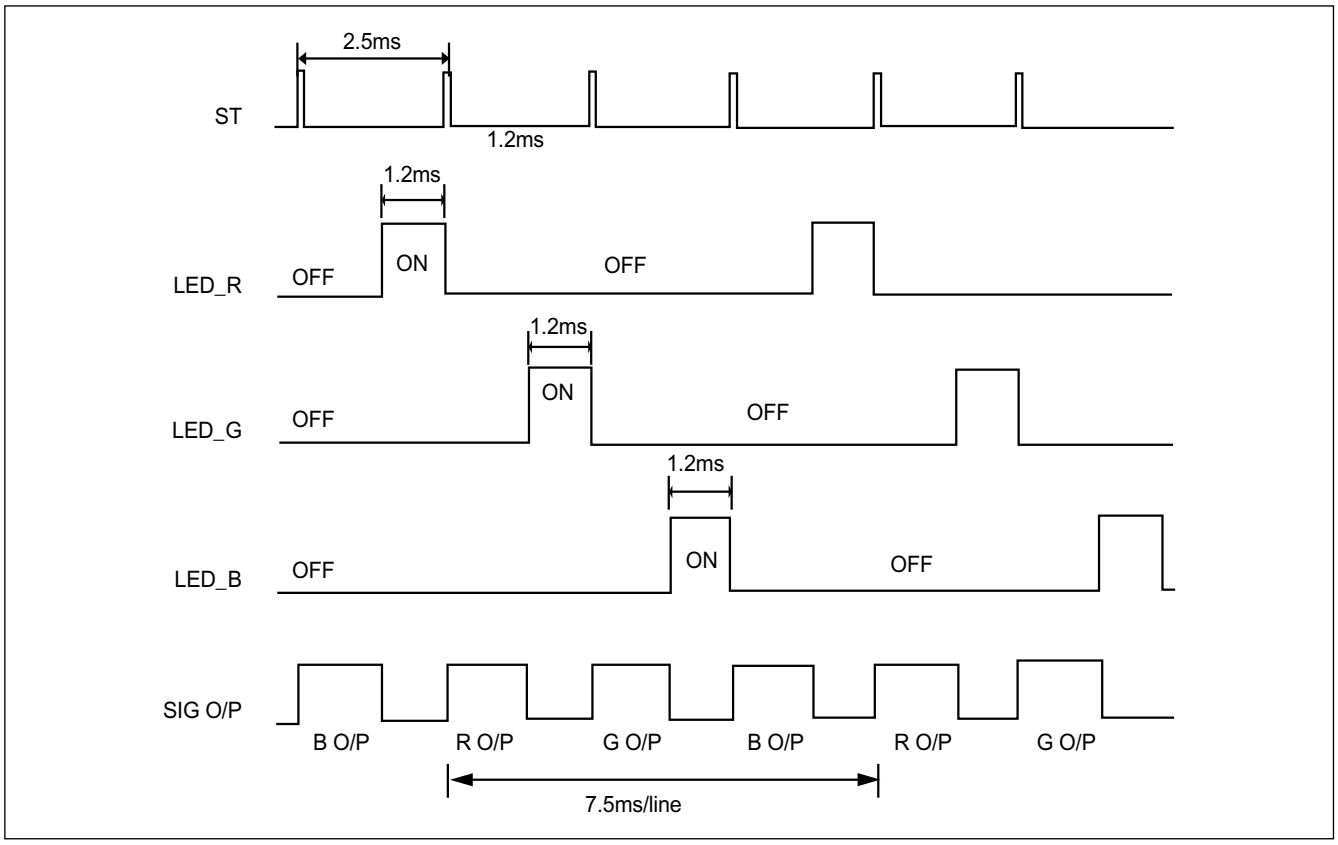
| Item | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|---|---|---|---|---|---|---|
| Power Supply | VDD | 4.75 | 5.0 | 5.25 | V | |
| | VLED | 4.75 | 5.0 | 5.25 | V | |
| Input Voltage | VIH | 3.2 | | | V | SI & CLK |
| | VIL | | | 0.8 | V | |
| Input Current | IIH | | | 20 | µA. | SI & CLK |
| | IIH | | | 0.2 | mA. | |
| LED Current | ILEDr | | | 30 | mA. | REF. |
| | ILEDg | | | 60 | mA. | REF. |
| | ILEDb | | | 60 | mA. | REF. |
| Clock Frequency. | CLK | | 2 | | MHz | |
| Clock Pulse “L” Duty | | | 15 | | % | tw/to |
| Setup Time | tsu | 0 | | tw/2 | ns | |
| Hold Time | th | | | tw/2 | ns | |
| SIG Delay Time | tpd 1 | | 250 | | ns | |
| | tpd 2 | | 30 | | ns | |
| Sampling Reriod | ts | | 90 | | ns | |

## CIS Driver Clock Timing



## CIS Block Diagram



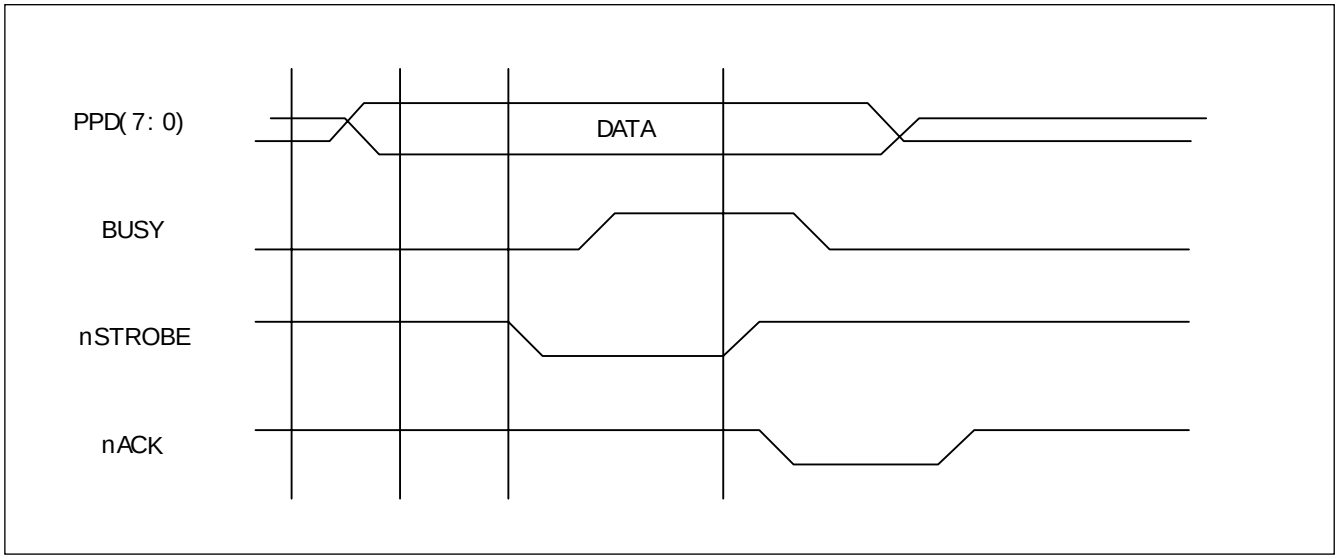



## 4-1-7 HOST INTERFACE:

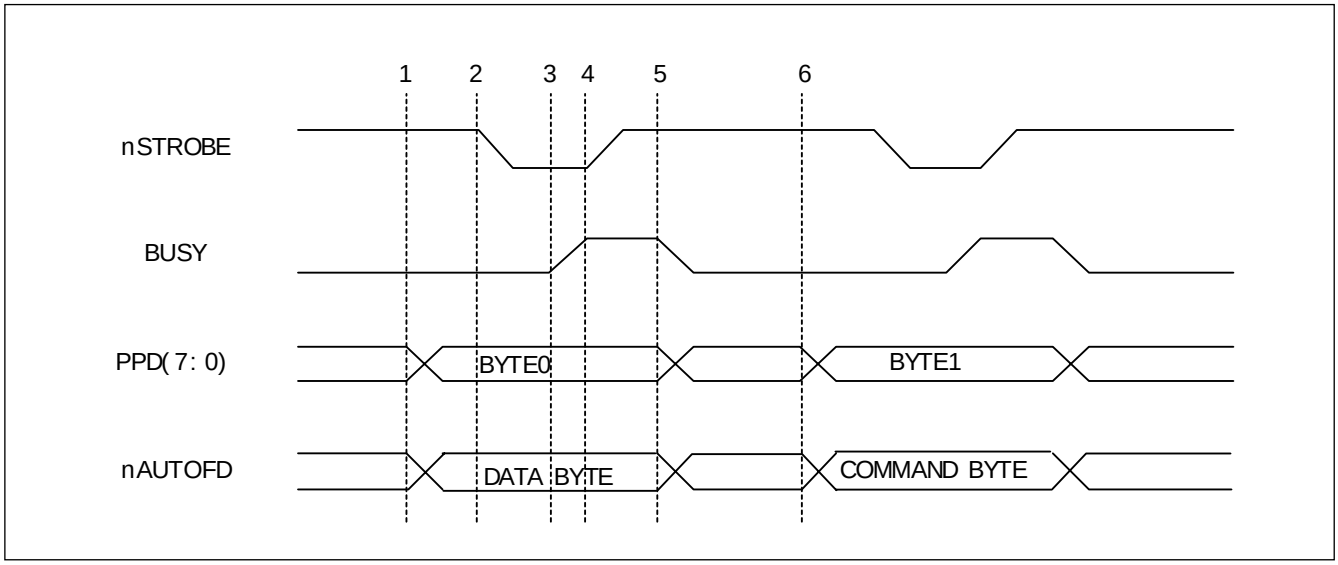
### Parallel Port Interface

PARALLEL PORT INTERFACE PART KS32C61100 has the Parallel Port Interface Part that enables Parallel Interface with PC. This part is connected to PC through Centronics connector. It generates major control signals that are used to actuate parallel communication. It is comprised of/ERROR, PE, BUSY, /ACK, SLCT, /INIT, /SLCTIN, /AUTOFD and /STB. This part and the PC data transmission method support the method specified in IEEE P1283 Parallel Port Standard (http://www.fapo.com/ieee1284.html).
In other words, it supports both compatibility mode (basic print data transmitting method), the nibble mode (4bit data; supports data uploading to PC) and ECP (enhanced capabilities port: 8bits data - high speed two-way data transmission with PC). Compatibility mode is generally referred to as the Centronics mode and this is the protocol used by most PC to transmit data to the printer. ECP mode is an improved protocol for the communication between PC and peripherals such as printer and scanner, and it provides high speed two-way data communication. ECP mode provides two cycles in the two-way data transmission; data cycle and command cycle. The command cycle has two formats; Run-Length Count and Channel Addressing. RLE (Run-Length Count) has high compression rate (64x) and it allows real-time data compression that it is useful for the printer and scanner that need to transmit large raster image that has a series of same data. Channel Addressing was designed to address multiple devices with single structure. For example, like this system, when the fax/printer/scanner have one structure, the parallel port can be used for other purposes while the printer image is being processed.This system uses RLE for high speed data transmission. PC control signals and data send/receive tasks such as PC data printing, high speed uploading of scanned data to PC, upload/download of the fax data to send or receive and monitoring the system control signal and overall system from PC are all processed through this part.

## COMPATIBILITY HARDWARE HANDSHAKING TIMING

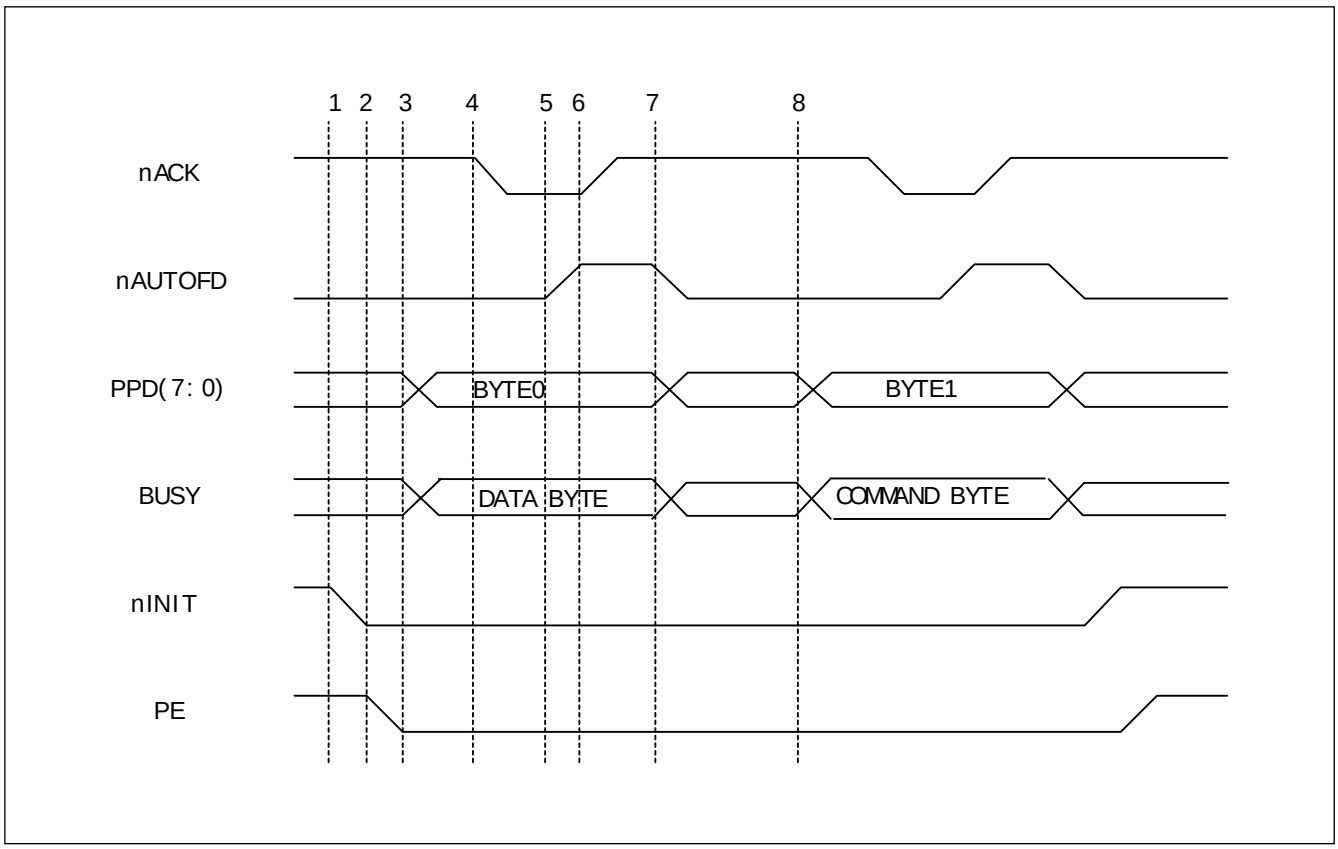



## ECP HARDWARE HANDSHAKING TIMING (FORWARD)




1. The host places data on the data lines and indicates a data cycle by setting nAUTOFD
2. Host asserts nSTROBE low to indicate valid data
3. Peripheral acknowledges host by setting BUSY high
4. Host sets nSTROBE high. This is the edge that should be used to clock the data into the Peripheral
5. Peripheral sets BUSY low to indicate that it is ready for the next byte
6. The cycle repeats, but this time it is a command cycle because nAUTOFD is low

## ECP HARDWARE HANDSHAKING TIMING (REVERSE)




1. The host request a reverse channel transfer by setting nINIT low
2. The peripheral signals that it is OK to proceed by setting PE low
3. The peripheral places data on the data lines and indicates a data cycle by setting BUSY high
4. Peripheral asserts nACK low to indicate valid data
5. Host acknowledges by setting nAUTOFD high
6. Peripheral sets nACK high. This is the edge that should be used to clock the data into the host
7. Host sets nAUTOFD low to indicate that it is ready for the next byte
8. The cycle repeats, but this time it is a command cycle because BUSY is low

# 4-2 OPE PBA

## 4-2-1 SUMMARY

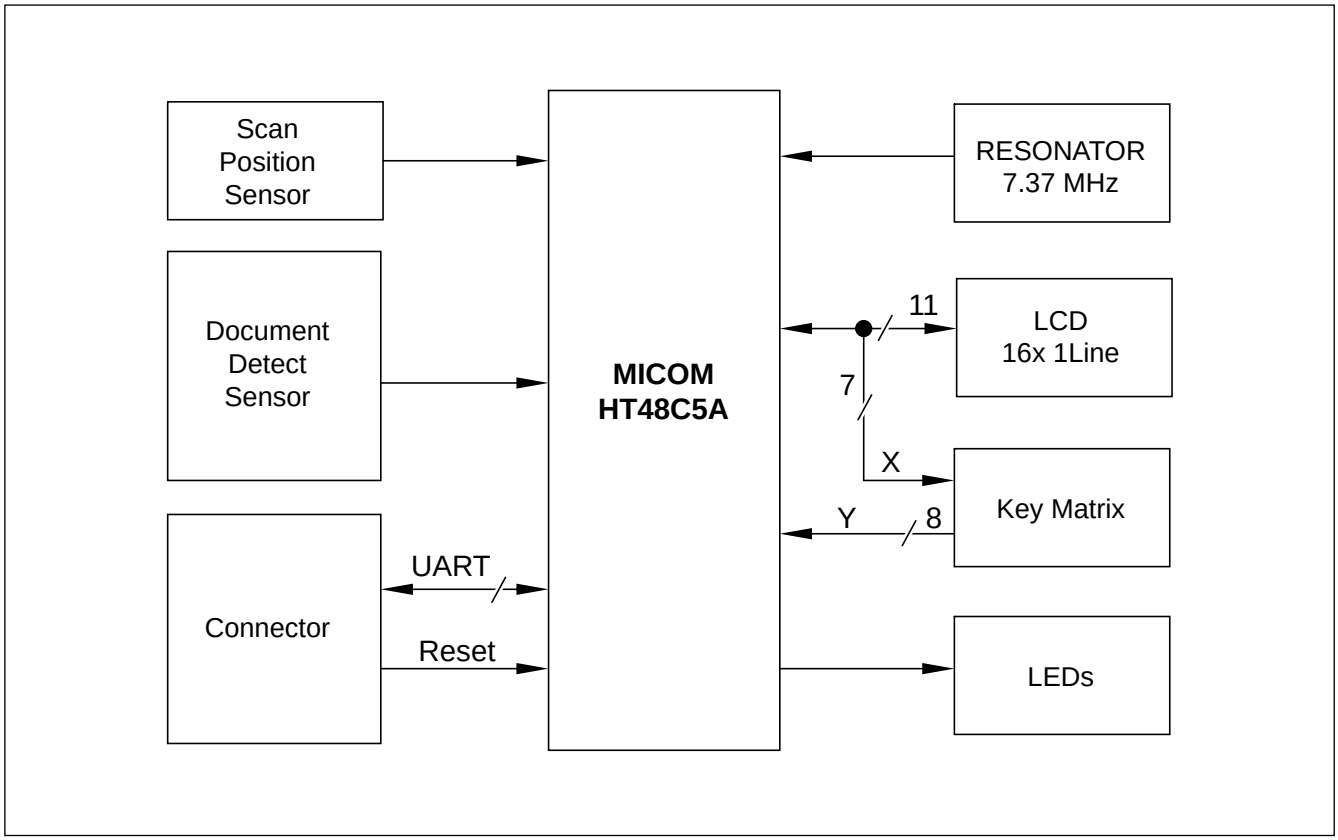
OPE Board is separated functionally from the main board and operated by the micom(HT48C5A) in the board. OPE and the main use UART (universal asynchronous receiver/transmitter) channel to exchange information. OPE reset can be controlled by the main.

OPE micom controls key-scanning and LCD and LED display, detects documents and senses SCAN position. If there occurs an event in OPE (such as key touch and sensor level change), it sends specific codes to the main to respond to the situation and the main analyzes these codes and operates the system.

For example, it the main is to display messages in OPE, the main transmits data through UART line to OPE according to the designated format and OPE displays this on LCD, LED. OPE's sensing is also transmitted to the main through UART line and then the main drives necessary operation.

OPE PBA consists of U1(MICOM, HT48C5A),LCD, key matrix, LED indicators, SCAN position sensor and the document detect sensor. Refer to OPE Schematic Diagram and Wiring Diagram sections of this manual.

- Display from the controller is received at U2 pin 47 (RX DATA).
- LCD drive signals are sent from P1-x pin group, P1-4~P1-14 pins.
- Machine status LED drive signals are sent from U2 LED0~LED4.
- Document detect sensor output is received at U2 pin 1.
- Scan position sensor output is received at U2 pin7




<OPE BLOCK DIAGRAM>

# 4-3 LIU PBA

The LIU (Line Interface Unit) using the discrete method is comprised of the following.

(1) Tel_line Interface Circuit that connects the PSTN(exchange) and the system (Facsimile)
(2) Telephone circuit composed of dial/speech circuit.

## 4-4-1 Tel_Line interface Circuit

Tel_Line Interface is the path that connects the signals between PSTN(exchange) and the system (Facsimile) and it is comprised of Tel-Line Interface Circuit and Impedance Matching Trans Circuit.

(1) TEL_LINE Interface Circuit
(2) TRANS Circuit for IMPEDANCE MATCHING

## 4-4-2 Telephone Circuit (Ringer/Dial/Speech Circuit, etc)

The telephone circuit is comprised of ring detect circuit, dialer circuit, speech circuit, external hook detect circuit and recall circuit.

(1) Ring Detect Circuit
(2) Dialling Circuit (including MF Dialling Signal Transmitting Circuit)
(3) Speech Circuit
(4) External Hook Detect Circuit
(5) Recall Circuit

## 4-4-3 Detailed Spec.

### TEL_LINE INTERFACE CIRCUIT

1) TEL_LINE INTERFACE CIRCUIT

- It is an interface that physically connects facsimile to the PSTN (public switching telephone network) through TIP and RING as in fig. 1.

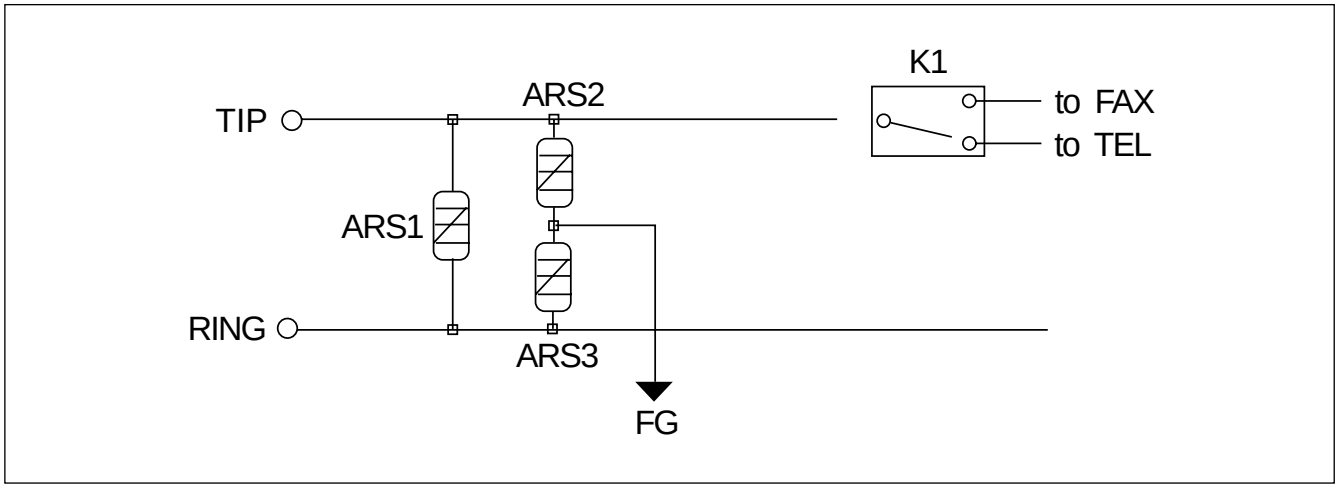
- ARS 1-3 protects the system from voltage overload such as the surge coming through PSTN. ARS 2 and ARS 3 are used as overload protection in common mode (between TIP/RING and FRAME GROUND). ARS 1 is used as overload protection in normal mode (between TIN and RING) and it uses ARRESTOR for 600V. However, arrestor's rated voltage differs from European and USA(400v).

- CML (CONNECT MODEM to LINE) RELAY K1 is a switch designed to selectively connect the PSTN to system voice communication path and fax communication path. In STAND_BY MODE and voice communication mode, it is connected to TEL PART and FAX PART while communicating and dialing.

- CML Relay (K1): CML relay interfaces with T2(600:600) TRANS in communication mode.

- DC Impedance: DC impedance is determined in the DC Feeding Unit. It represents DC characteristic of the computer connected through -48V DC power of the switch and lines. The DC characteristic of required by the communication standards of a number of countries is the DC resistance of 50Ω~300Ω to the current range of 20mA~120mA. (value varies depend on countries).

- AC Impedance or Return Loss: AC impedance is determined by the peripheral circuits of T2 Transformer. It is the standard required for optimum signal transmission between computer and switch. When the AC impedance of the computer for AC signal transmission and the AC impedance of the switch matches, the signal can be transmitted without loss. Therefore, communication standards specifies the AC impedance of the computer and it implies the return loss. The communication standards of each country, considering the characteristic of their lines, requires 600Ω or the return loss of 14dB and higher against the AC impedance of Complex and the AC signals of 300Hz~400Hz. The AC impedance of transformer changes depending on the load resistance, the core material, coil inductance and resistance, but generally its characteristic against load resistance is considered.




<TEL_LINE INTERFACE CIRCUIT>

## RINGER DIAL CIRCUIT

1) Ringer Circuit
- The ring detect circuit detects the ring signal by sending the bell signal sent from PSTN to the primary photo coupler (PC814). At this point, C(1uF/250V) is used to match the ring impedance and R is coupled directly in order to prevent any damage to the photo coupler due to ring voltage.

2) Dialing Circuit
- Dialing circuit is initiated only when the power is on and it is transmitted to line through the modem of main part (T2 trans)

3) External Hook Detect Circuit
- In the discrete LIU method, the external hook detect circuit is designed to use both the photo coupler and current detector in order to be used in all countries including the countries with low series resistance (Germany, Switzerland, Belgium, Austria, etc.). To use photo coupler (PC814), you must carefully select the resister connected parallel (75Ω) to the photo coupler in order to satisfy the voltage drop standards of England and a few other countries. The diode connected to the current detector pin (5/6) was used to detect the external hook all through when the line parity turns over.

4) Recall Circuit
- In the discrete LIU method, we used the recalling method using low cost photo coupler instead of using photo MOS relay in order to initiate the recalling for handset hook off dialling after the power is turned on. In this case, the time break recall was enabled by switching the power transistor of the telephone circuit using the secondary CPU control.

# 4-4 Engine PPA

## 4-4-1 Engine Configuration

#### 4-4-1-1. Video Controller Board

Video Controller Board receives image data from the host computer and converts it into bitmap (binary) image or receives bitmap image directly from the host computer and sends it to the engine controller board.

#### 4-4-1-2. SMPS Board

It basically receives AC input and generates ripple-free DC level +5V and -5V +24V. Next, it supplies these voltages to each unit appropriately.

It also supplies AC power to heat lamp of fixing unit.

#### 4-4-1-3. HVPS Board

HVPS board generates high voltages of THV/MHV/Supply/Dev and supplies them to the developing unit to create images. It is designed to realize optimum conditions for the images.

This board includes LSU interface unit and cover open sensing unit that it intercepts +24V voltage to the main motor, LSU, fan, clutch and fixing unit when you open the front cover.

#### 4-4-1-4. Developer

Using the digital picture process, developing unit generates visible images. It is comprised of charge roller, OPC drum, developer roller, supply roller and toner.

#### 4-4-1-5. LSU (Laser Scanning Unit)

This is controlled by engine controller. Using laser beam control, exposure of OPC drum and the rotational principle of polygon mirror, it forms electro-static latent image in the OPC drum with the video data received from engine. It is the core part of LBP. OPC drum synchronizes with the feeding speed of the paper and rotates. When the laser beam inside LSU reaches at the end of polygon mirror, it generates /HSYNC signal and send it to engine. Then the engine detects /HSYNC signal and adjusts the lengthwise row of the image on the paper. After detecting /HSYNC and after set time period, it sends the video data to LSU to adjust the left margin on the paper.

The one side of the polygon mirror is the one line scanned.

#### 4-4-1-6. Transfer

Transcribing unit is comprised of PTL(pre-transfer lamp) and transcribing roller. PTL detects the beam of the OPC drum, lowers the electric potential of the developing unit and lower the adhesiveness of toner to enhance transcription coefficient.

And the transcribing roller transfers the toner (constituting element of video image) on OPC drum to the paper.

#### 4-4-1-7. Fixer

It is comprised of heat lamp, heat roller, pressure roller, thermistor and thermostat. It fixes the toner powder transferred to the paper on the paper using pressure and high heat in order to finish the final printing job.

## 4-4-2. Developing Process

#### 4-4-2-1 Feeder

Engine operates this unit. Solenoid rotates the feed roller and feeds one paper. Then the paper is fed into the set and hits the actuator of the feed sensor. At this point, the engine detects the signal and prepares to spray according to the image data. If any problem happens to this feed sensor operation, the system displays “paper jam error” on the OP panel.

Also, feed sensor unit is closely related to the paper margin.

#### 4-4-2-2. Electrifier

This unit electrifies consistent negative voltage to OPC. When the high negative voltage (-1550V) is allowed to charge roller, the OPC drum surface will be consistently electrified with approximately +1300V. This is the first process in generating the digital picture.

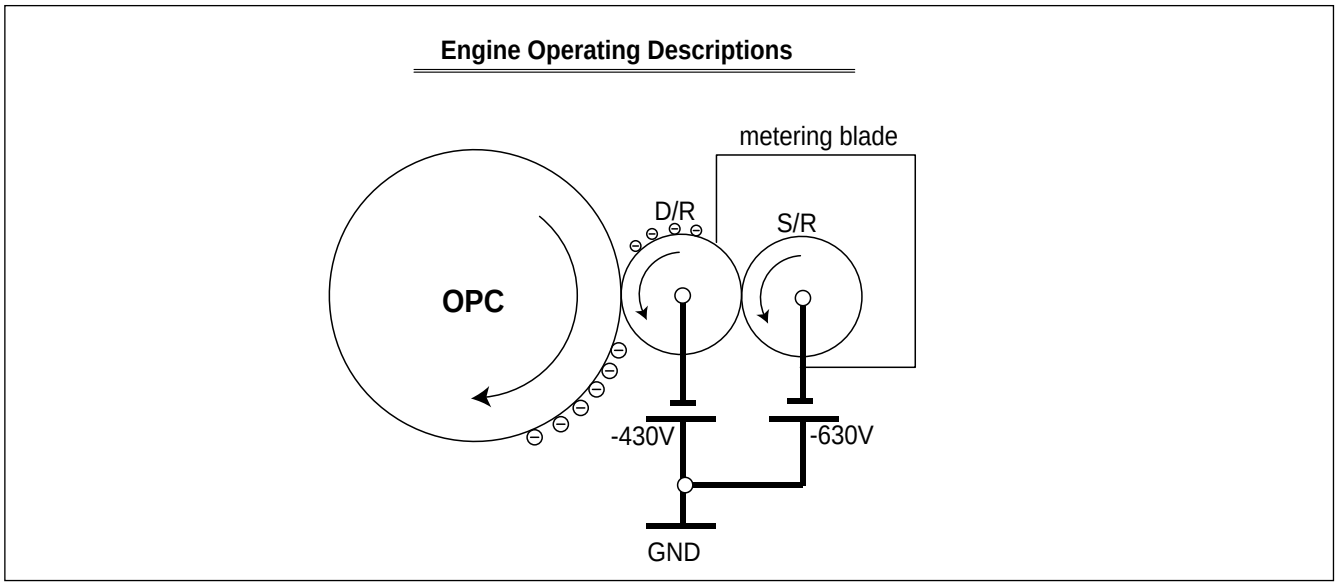
#### 4-4-2-3. Exposer

After receiving bitmap image data from engine board, LSU turns the laser diode either on or off depending on whether the digital data is present or absent in order to expose the OPC drum with the switched laser beam data. The difference between the voltages generated at this point is presented above. In other words, the part exposed to the laser will have -50V and its relative electric potential will increase and form electrostatic

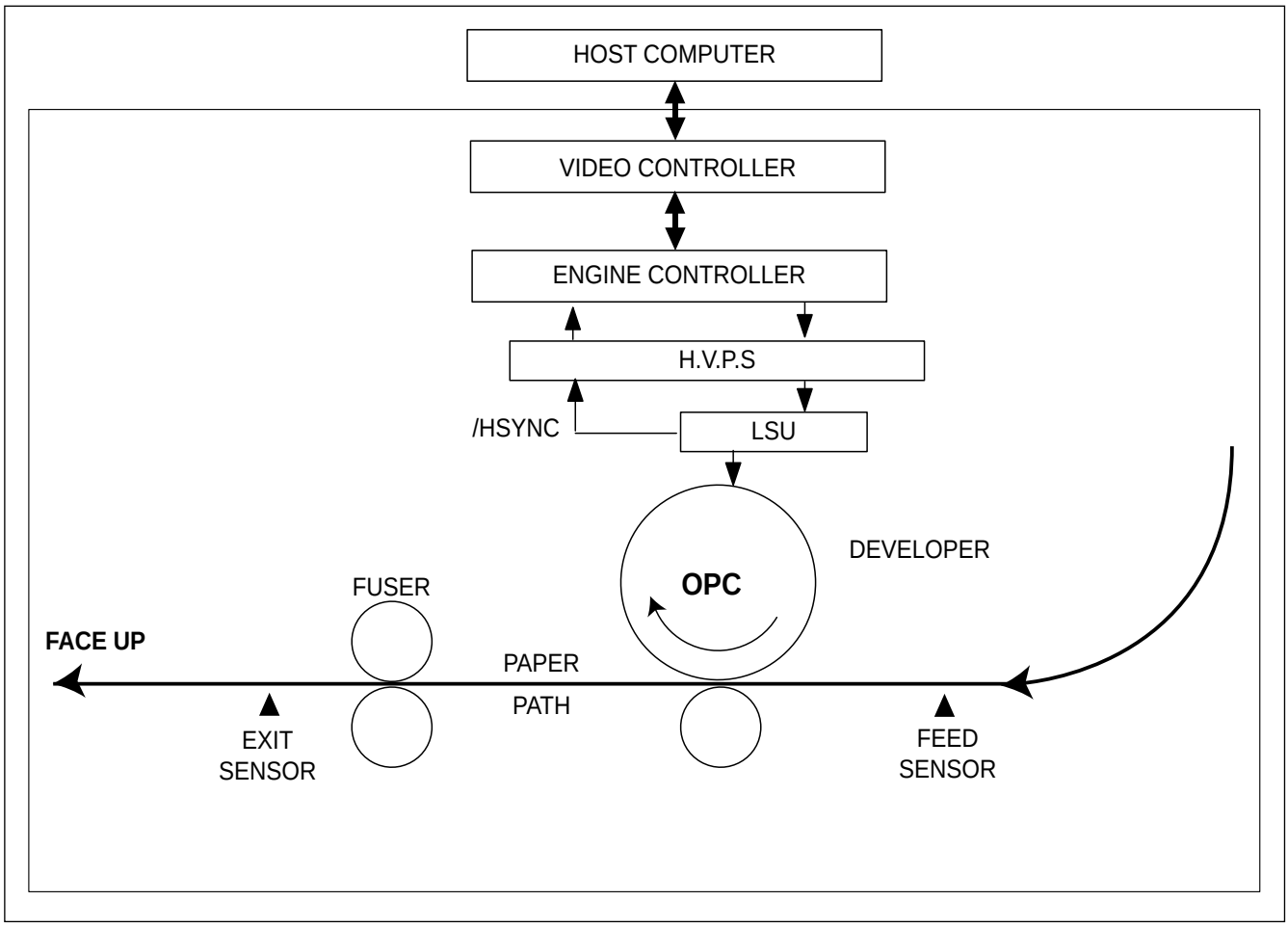
latent image.

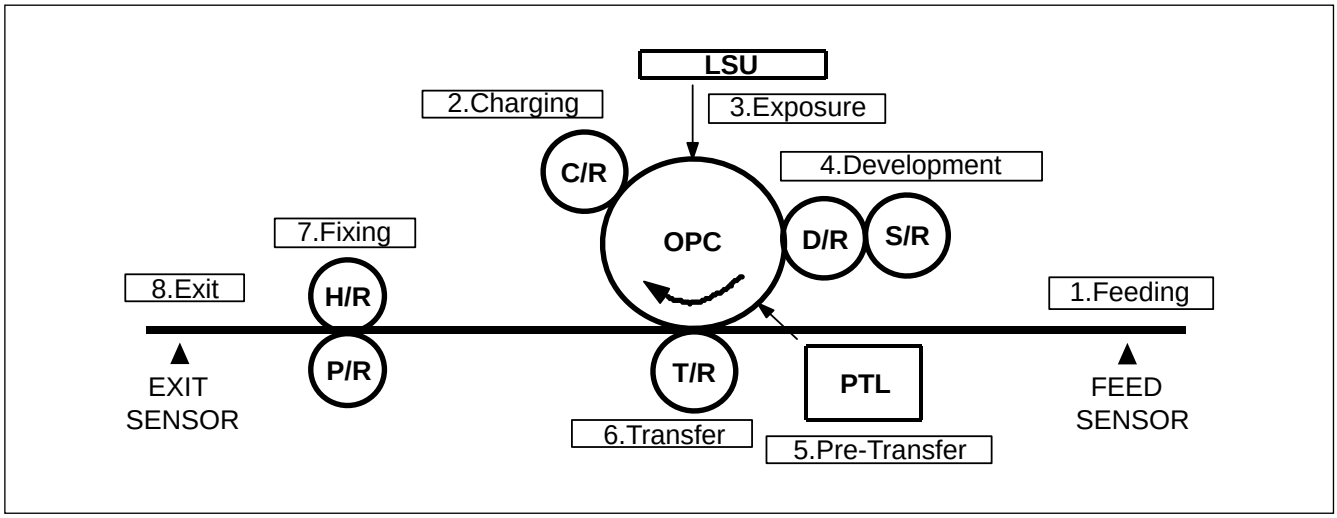
The part unexposed to the laser as it did not have the video data will consistently retain -800V. Eventually, the image will form in the part electrified and rose to -50V(forms black dot) and the part retaining -800V will be white in order to make the basic condition to form the video data.

## DEVELOPER BLOCK DIAGRAM




## OVERALL OPERATING STRUCTURE OF THE SYSTEM



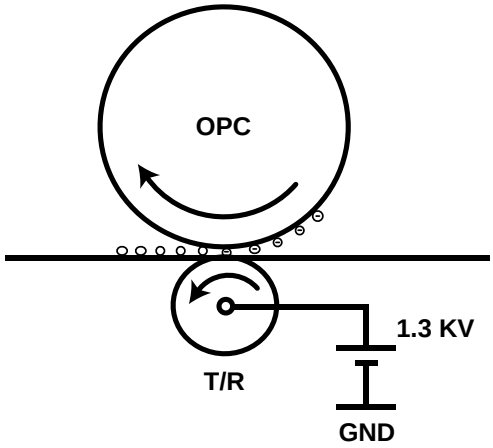



< Engine Operating Description >

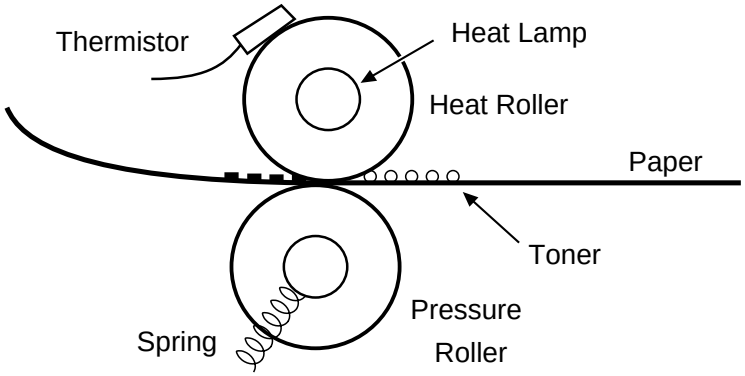
**4-4-2-4. Developer Unit**

On the surface where OPC drum and developer roller (rotate in opposite direction) meet, the toner that has negative electric characteristic moves to the exposed part (-50V) due to the electric potential difference, but it will not move to the unexposed part (-800V).

**4-4-2-5. Transfer Unit**




Toner on the OPC drum is transferred to paper by transfer unit. In other words, the toner on the OPC drum surface is inducted by the transfer roller electrified to approximately +1.3KV(600~2800V variable) to the paper.
At this point, the voltage (600~2800V variable) is determined by temperature and humidity.
The above process is called “transfer”.



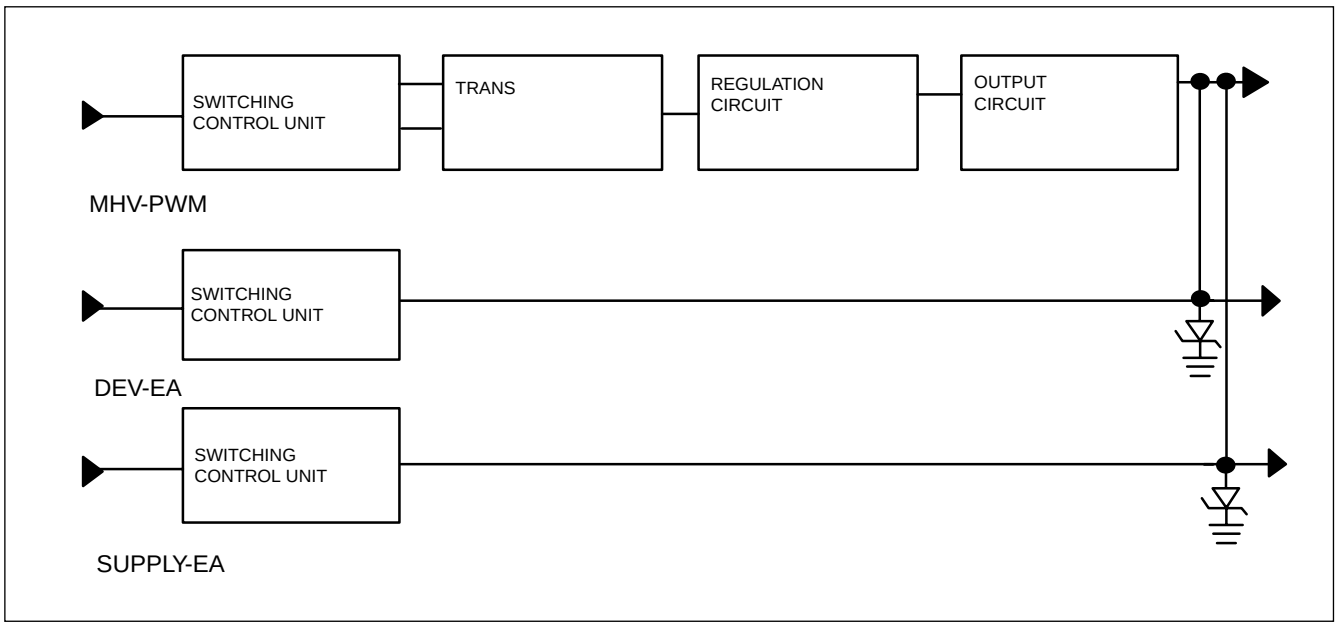

**4-4-2-6. Anchorage unit**

The toner transferred on to the paper is at the electronically low state and it can be easily scattered. Considering this fact, we used heat (180°C) and pressure (4kg) to fix the toner on the paper permanently. Then the image formed will remain on the paper permanently. Heat roller transfers the heat from the heat lamp inside to the paper. The surface of the heat roller specially coated with Teflon repels toner melted by the heat from the surface.
The pressure roller on the bottom of the heat roller is made of silicon resin and its surface is also coated with Teflon. The thermistor of the fixer unit detects the surface temperature of the heat roller and feeds this information back in order to retain 180°C while printing and 135°C, while on standby. The thermostat is used as the secondary safety device and it prevents overheat by shutting the main power when the heat lamp
is overheated.

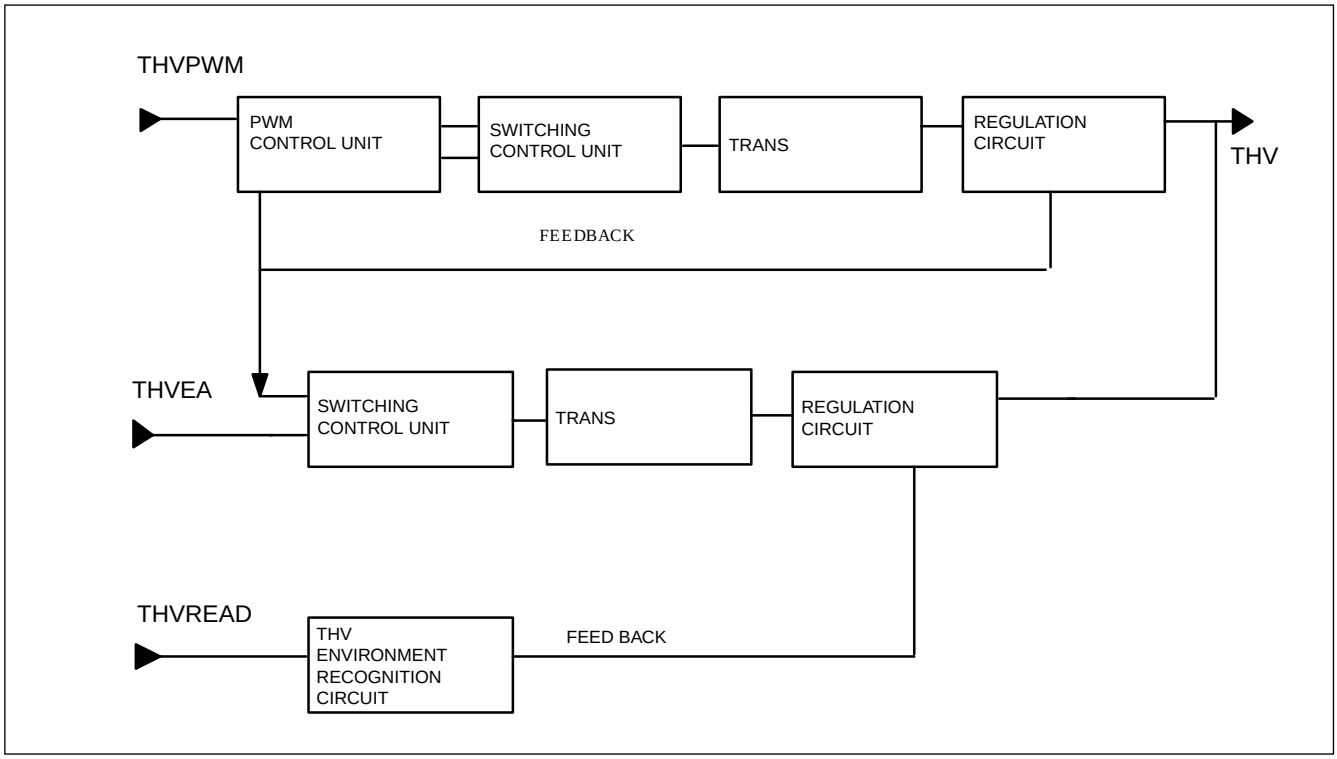
**4-4-2-7. Exit**

After the digital picture process is finished, the printed paper will come out of the set through the exit sensor. The signal detected will be transferred to the engine and provide the position information. If the actuator and the sensor do not work normally, the system will display “Paper Jam 2 Error”.

## BIAS OUTPUT UNIT BLOCK DIAGRAM



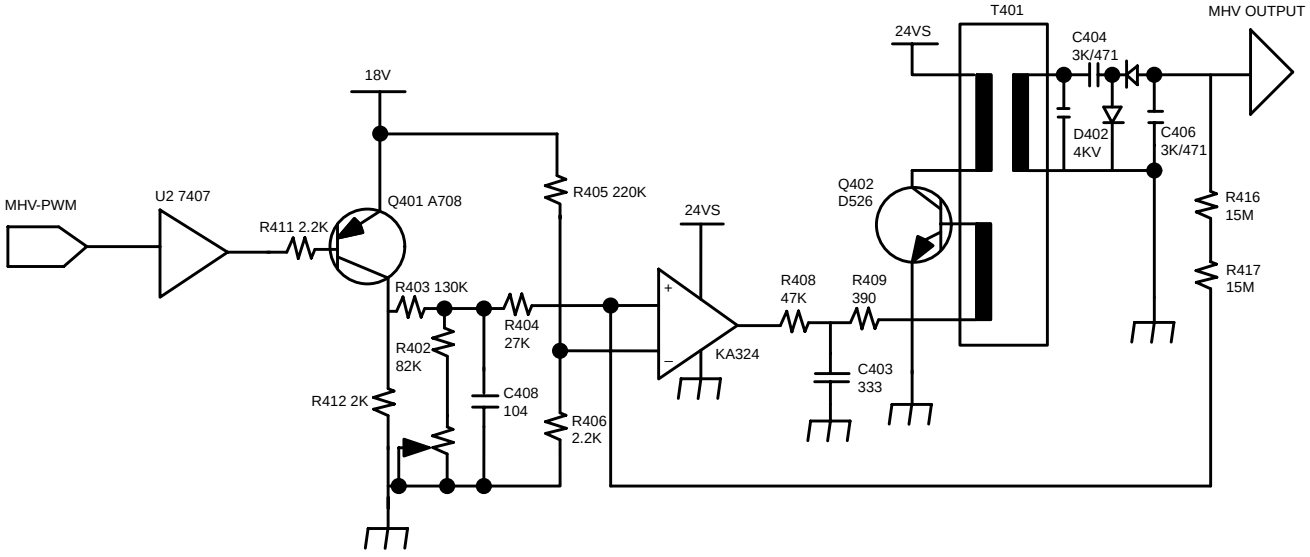

## TRANSFER OUTPUT UNIT BLOCK DIAGRAM



### 4-4-2-8. MHV (Electrification Output Enable)

Electrification Output Enable is the electrification output control signal 'PWM-LOW ACTIVE'.
When MHV-PWM LOW signal is received, Q401 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage higher than the inverting reference voltage of OP-AMP, which is set to R405 and R406, OP-AMP output turns high.

This output sends IB to the TRANS auxiliary wire through current-restricting resistance Q402 via R408 and C403 and Q402 turns on. When the current is accepted to Q402, Ic increases to the current proportional to time through the T401 primary coil, and when it reaches the Hfe limit of Q402, it will not retain the "on" state, but will turn to "off". As Q402 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary unit, sends current to the load and outputs MHV voltage through the high voltage output enable, which is comprised of Regulation– circuit.



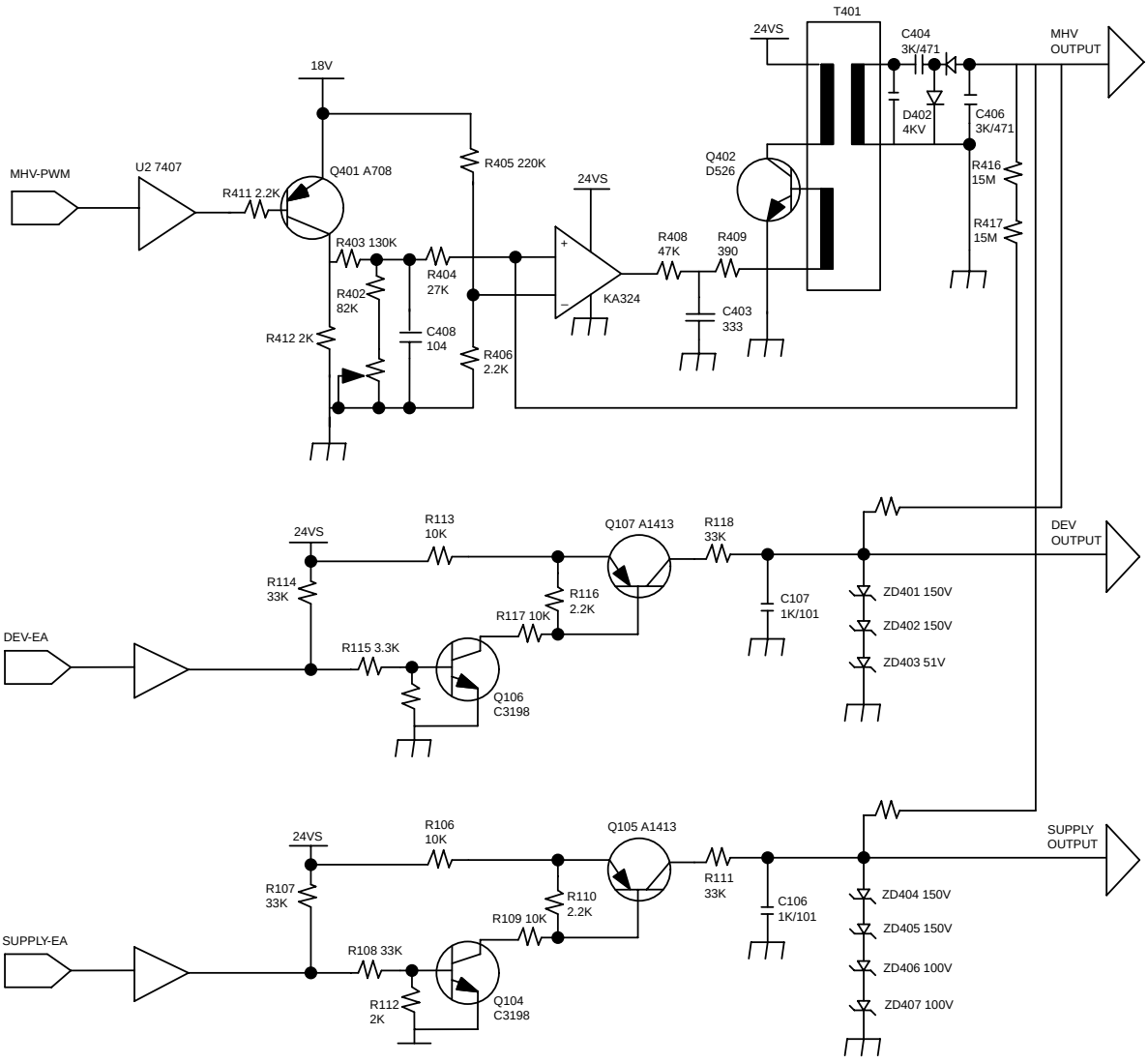
### 4-4-2-9. BIAS (supply/dev output unit)

BIAS voltage output is generated only when electrification voltage is set to output. In the circuit presented above, it organizes enough zener-diodes required to output dev/supply voltage from electrification output.

Supply voltage is output when the supply-ea signal is 'L'. When supply-ea is 'L', Q104 turns off and as Q105 does not turn on, the electric potential of the output unit retains the electric potential of zener and thus -500V is output as the supply voltage.

In case supply-ea signal is 'H', both Q104 and Q105 will turn on and the electric potential of the output unit will not retain the electric potential of zener and become GND level and thus the output voltage will become .

The output condition of developer voltage is the same as that of the supply voltage.



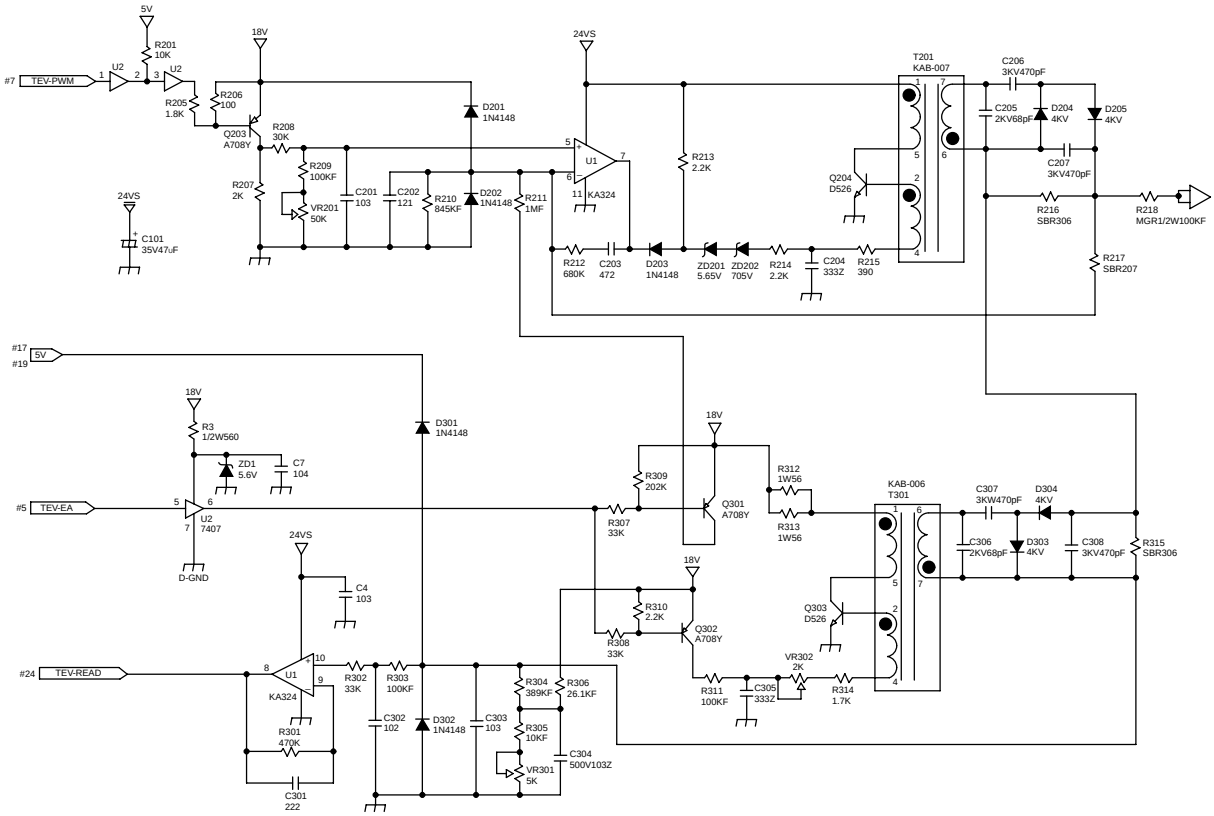
### 4-4-2-10. THV(THV(+)/THV(-) Output Unit)

Transfer(+) output unit is the transfer output control signal 'PWM-LOW ACTIVE'.

When THV-PWM LOW signal is received, Q203 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage is higher than the inverting reference voltage of OP-AMP, OP-AMP output turns high.

The 24V power adjusts the electric potential to ZD201 and ZD202, sends IB to TRANS auxiliary wire through current-restricting resistance R215 via R212 and C204, and eventually Q204 will turn on. When the current is accepted to Q402, Ic increases to the current proportional to time through the T201 primary coil, and when it reaches the Hfe limit of Q204, it will not retain the "on" state, but will turn to "off". As Q402 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary coil, sends current to the load and outputs THV voltage through the high voltage output enable, which is comprised of Regulation– circuit. The output voltage is determined by the DUTY width. Q203 switches with PWM DUTY cycle to fluctuate the output by fluctuating the OP-AMP non-inverting end VREF electric potential, and the maximum is output at 0% and the minimum, at 100%.Transfer(-) output unit is THV-EA 'L' enable.

When THV-EA is 'L', Q302 turns on and the VCE electric potential of Q302 will be formed and sends IB to TRANS auxiliary wire through R311, C305 and VR302 via current-restricting resistance R314, and eventually Q303 will turn on. When the current is accepted to Q303, Q303's Ic increases to the current proportional to time through the T301 primary coil, and when it reaches the Hfe limit of Q303, it will not retain the "on" state, but will turn to "off". As Q303 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary coil, send current to load and output THV(-) voltage through the high voltage output enable, which is comprised of Regulation– circuit.



### 4-4-2-11. Environment Recognition

THV voltage recognizes changes in transfer roller environment and allows the voltage suitable for the environment in order to realize optimum image output. The analog input is converted to digital output by the comparator that recognizes the environmental changes of the transfer roller. It is to allow the right transfer voltage to perform appropriate environmental response considering the environment and the type of paper depending on this digital output by the programs that can be input to the engine controller ROM.

For ML-5000 or ML-5200 series, this environment recognition setting is organized as follows: First, set the THV(+) standard voltage. Allow 200MΩ load to transfer output, enable output and set the standard voltage 800V using VR201. Then set 78 (CPU's recognition index value) as the standard using VR302. This standard value with CPU makes sure that the current feedback is 4μA when output voltage is 800V and load is

200MΩ.If the load shows different resistance value when 800V is output, the current feedback will also be different and thus the index value will also be different. according to the index value read by CPU, the transfer voltage output will differ according to the preset transfer table.

The changes in transfer output required by each load is controlled by PWM-DUTY.

# 5. Troubleshooting

## 5-1 Preventative Maintenance

The cycle period outlined below is a general guideline for maintenance. The example list is for an average usage of 50 transmitted and received documents per day.
Environmental conditions and actual use will vary these factors. The cycle period given below is for reference only.

| | COMPONENT | CLEANING CYCLE | REPLACEMENT CYCLE | SOLUTION |
|---|---|---|---|---|
| SCANNER | ADF Rubber | 6 Months | 10,000 Pages | |
| | ADF Roller | 1 Year | 20,000 Pages | |
| | White Roller | As Needed | 10,000 Pages | |
| | CIS | As Needed | | |
| PRINTER | Cartridge | | 2,500 Pages | |
| | Pickup Roller | | 60,000 Pages | |
| | Feed Roller | | 50,000 Pages | |
| | Transfer Roller | | 60,000 Pages | |
| | Fuser | | 50,000 Pages | |

## 5-2 Tech Mode

In Tech mode, the technician can perform various tests to isolate the causes of a malfunction, and set the technical option features to customize the machine depending on the user's operation environment.

**To access TECH mode**

: Press SETUP, #, 1, 9, 3, 4 in sequence, and the LCD displays 'TECH' in the standby mode screen. While in TECH mode, the machine still performs all normal operations.

**To return to the normal user mode**

: Turn the power off, then back on.

The technical options you have set in TECH mode are not changed unless you clear the machine's memory in TECH mode.

To communicate via direct connection with another fax machine, press OHD/V.REQ followed by Start/Enter.

• Caution :
When you finish operating in Tech Mode, you must turn the power Off/On.

### 5-2-1 System Data List in TECH MODE

| Function | Item | Content | Default |
|---|---|---|---|
| FAX NUMBER/NAME | FAX NUMBER<br>FAX NAME | | |
| TIME/DATE SETUP | DATE FORMAT<br>TIME/DATE | EUROPE/USA | USA |
| SYSTEM SETUP | LANGUAGE | ENG/GER/FRE/ITA/SPA/POR/DUT | ENGLISH |
| | SENDING MEMORY | ON/OFF | ON |
| | SEND FROM CONFIRM | ON/OFF/ERROR | ERROR |
| | FAX PAPER SIZE | LETTER/A4/LEGAL | LETTER |
| | TONER SAVE MODE | ON/OF | OFF |
| | POWER SAVE MODE | OFF/5/10/15 | 5 MIN |
| | AUTO REDUCTION | ON/OFF | ON |
| | DISCARD SIZE | 0~30mm | 20MM |
| | RINGS TO ANSWER | 1~7 | 2 |
| | STAMP RCV.NAME | ON/OFF | OFF |
| | RCV.START CODE | 0~9 | * 9 * |
| | ECM MODE | ON/OFF | ON |
| | CALLER ID | ON/OFF | OFF |
| | JUNK FAX BARRIER | ON/OFF | OFF |
| | DRPD MODE | ON/OFF | OFF |
| TECH MODE | MODEM SPEED | 2.4/4.8/7.2/9.6/12.0/14.4/28.8/33.6 | 33.6 KBPS |
| | DIALING MODE | TONE/PULSE | TONE |
| | SEND FAX LEVEL | 0~15 | -12 DBM |
| | FLASH TIME(RECALL TIME) | 80/280/600 | 600 MS |
| | PAUSE TIME | 1~9 | 3 SEC |
| | REDIAL INTERVAL | 1~15 | 3 MIN |
| | REDIAL COUNT | 0~5 | 2 |
| | DP MAKE/BREAK | 40/60~33/67 | 40/60 |
| | SILENCE TIME | UNLIMITED/12SEC | UNLIMITED |
| | ERROR RATE | 5%/10% | 10% |
| | IGNORE TONER EMPTY | ON/OFF | OFF |
| GROUP DIAL SETUP | GROUP NO[1-20] | | |
| VOLUM SETUP | ALARM VOLUM | ON/OFF | ON |
| | KEY VOLUM | ON/OFF | ON |
| MEMORY CLEAR | FAX NUMBER/NAME<br>DIAL/SCHEDULE<br>JOURNAL<br>DEFAULT SETUP | | |
| MEMORY CLEAR | LCD DISPLAY “ARE YOU SURE?” | | |
| MAINTENANCE | CLEANING DRUM | | |
| | ADJUST SHADING | | |
| | REMOTE TEST | OFF/ON | |
| | NOTIFY TONER LOW | OFF/ON | |
| | ROM TEST | ROM OK! (VERSION) | |
| | CIS TEST | | |
| | DRAM TEST | DRAM OK | |
| | SWITCH TEST | | |
| | MODEM TEST | | |
| | DTMF TEST | | |
| | TONER COUNT | | |
| | PRINTING INFO | OFF/ON | |
| | PROGRAM DOWNLOAD | | |
| | SCAN COUNT CLEAR | COUNT CLEARING . | |

: Only Tech Mode

## 5-2-2 Tech Mode Options

In TECH mode, press SETUP, then press ◄ or ► until 'TECH MODE' appears in the display. Press Start/Enter. The following technical options are available.

**Note :** If necessary, print System Data List in TECH mode. The list shows all current system data settings including the TECH MODE options. To print the system data list, press Report/Help, then press ◄ or ► until 'SYSTEM DATA' appears in the display, and press Start/Enter.

**Modem Speed**

- You can set the maximum modem speed.
- Communication is done with modem speed automatically set at lower speed when communicating with the modem with lower speed since communication is done on the standard of the side where modem speed is low for transmission/reception. It is better set 33.6 KBPS as default setting.

**DIALING MODE**

- Select the dialing mode according to the user's line status.
- TONE: Electrical type of dial
- PULSE: Mechanical type of dial

**SEND FAX LEVEL**

- You can set the level of the transmission signal. Typically, the Tx level should be under -12 dBm. The level within the range of 1 to -15 dBm is acceptable.
- **Caution:** The Send Fax Level is set at the best condition in the shipment from factory. Never change settings arbitrarily.

**FLASH TIME**

- Set the flash time to 80, 280, or 600 milliseconds.

**PAUSE TIME**

- Pause time mean delay time (unit: second) inserted between dial number signal and the next number of signal in the automatic dial (One touch, Speed dial, Redial) and the manual dial.
- **Caution:** The Send Fax Level is set at the best condition in the shipment from factory. Never change settings arbitrarily.

**REDIAL INTERVAL**

- If the remote machine is busy when the machine sends a fax using automatic dialing, the machine automatically redials the number. Select the time interval between automatic redial attempts. Enter the desired redial interval using the number keypad: 1 - 15 minutes.

**REDIAL COUNT**

- You can set times that redial automatically attempts when automatic transmission is done or when the remote machine is busy or when the machine send a fax. If there is no response after redialing by the times already set, redial is no longer attempted. No redial is attempted if the settings is 0. Enter the desired times from 1 through 5.

**DP Make/Break**

- Select the dial pulse make and break time: 40-60 or 33-67
- **Caution:** Send Fax Level is set at the best condition in the shipment from factory. Never change settings arbitrarily.

**SILENCE TIME**

- In ANS/FAX mode, after a call is picked up by the answering machine, the machine monitors the line.
- If a period of silence is detected on the line at any time, the call will be treated as a fax message and the machine begins receiving.
- Silence detection time is selectable between limited (about 12 seconds) and unlimited time.
- When '2 sec' is selected, the machine switches to receiving mode as soon as it detects a period of silence. When 'unlimited'is selected, the machine waits until the answering operation is concluded even though a period of silence is detected. After the answering operation is concluded, the machine switches to receiving mode.

**ERROR RATE**

- When the error rate is about to be over the setting value, the Baud rate automatically lowers up to 2400 bps to make the error rate remain below the setting value.
- You can select the rate between 5% and 10%.

**IGNORE TONER EMP**

- You can set this function ON if desiring to drive the engine continuously even though the life of toner is run out and it becomes Toner Empty status.

## 5-2-3 Maintenance Options

In TECH mode, press SETUP, then press ◄ or ► until 'MAINTENANCE' appears in the display. Press Start/Enter. The following technical options are available

**CLEAN DRUM**

- Use this feature to get rid of the toner remained in the development unit, so you can get a clean printout.Perform this feature if stains or specks appear on the printing materials and print quality falls.
- Perform this feature several times until a clean printing material appears.

**ADJUST SHADING**

- Use this feature to correct the white reference of the scanner if you experience bad copy images. When using this feature, a white paper should be used to get clean copy images.

- Use this adjustment feature to achieve best image (scan) quality depending on the characteristics of the CIS (Contact Image Sensor) parts.

  1. Select [ADJUST SHADING] from the Service Mode.
  2. Insert a clean white original [Letter Size] into the paper loading part.
  3. Original is scanned if pressing the Setting button.
  4. If the original scan is completed, message is displayed on the LCD window and CIS SHADING PROFILE is output.

- If the output image is different from the normal screen, the CIS is poor.

Caution:
1. Always perform the CIS TEST after downloading Firmware. Otherwise, the system may not operate properly.
2. Always perform ADJUST SHADING after replacing the CIS.
3. Always use a clean white paper in ADJUST SHADING (Maximum paper width: Letter Size).
4. ADJUST SHADING may be performed even in the User Mode but ADJUST SHADING profile is output only in the TECH MODE.

**REMOTE TEST**

- The Remote Test feature can be enabled in order to allow a remote location to call up and run a diagnostic test on your machine. You may be instructed by a service representative to enable this feature.

**NOTIFY TONER LOW**

- With this feature enabled, when the toner becomes low, the toner low information will be sent to ta specified contact point, for example, the service company. After you access this menu, select ON, and when the LCD prompts, enter the name and the number of the contact point, the customer's fax number, the model name, and the serial number.

**ROM TEST**

- Use this feature to test the machine'S ROM. The result and the software version appear in the LCD display.

**CIS TEST**

- This test checks the operation of the Contact Image Sensor (CIS). Each time the number changes by one increment, the average ADC value of CIS prints out.

**DRAM TEST**

- Use this feature to test the machine's DRAM. The result appears in the LCD display.

**SWITCH TEST**

Use this feature to test all keys on the operation control panel. The result is displayed on the LCD window each time you press a key.

**MODEM TEST**

- Use this feature to hear various transmission signals to the telephone line from the modem and to check the modem.
- If no transmission signal sound is heard, it means that the modem part of the main board is poor.

**DTMF TEST**

- DTMF (Dual Tone Multi Frequency) signal. When you press any key on the number keypad including • and #, you will hear the corresponding key tone.

**TONER COUNT**

- This feature shows the current state of the toner cartridge.
- TONER CNT: The total number of the dots used to print up to current time.
- CRU STATE: The page number which the toner cartridge can print.

• Caution : After replacing Main board to new one, you should update the information to the new board.

### PRINTING INFO

- This feature allows the machine to automatically print various information, like toner count, transfer voltage, fusing temperature and so on, at the bottom of each printed page.
- PAGE TONER CNT: prints the number of dots used to print the page.
- TOTAL TONER CNT: prints the total number of the dots used to print up to current time.
- THV ON DUTY: prints ADC value of transfer voltage.
- THERMISTER: prints ADC value of fusing temperature.
- P: prints the page number.

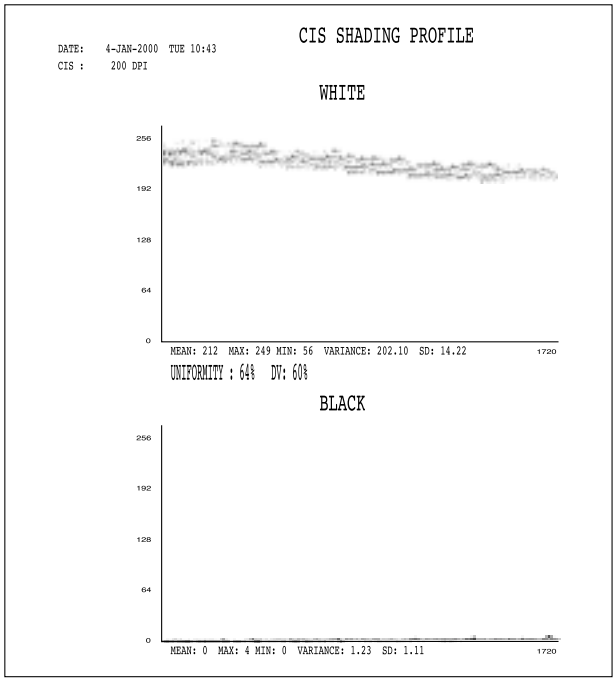
### PROGRAM DOWNLOAD

- Use this feature to download a new upgraded ROM file from a PC that is connected to the machine with a parallel cable (IEEE 1284).

### SCAN COUNT CLEAR

- If performing this feature, the value of scanning original until now is initialized (0). (Total scan count value on the system data list becomes 0.)

### Adjust Shading Sample Pattern



## 5-2-4 Printout Report

In TECH mode, press Report/Help, then select the desired list or report by using ◄ or ► key, then press Start/Enter. The following options are available

**HELP**

- It shows a brief description on the machine's basic functions and commands.Use it as a quick reference guide

**SENT JOURNAL**

- This journal shows a specific information concerning transmission activities, the time and dates of up to 40 of the most recent transmissions.

**RECEIVED JOURNAL**

- This journal shows a specific information concerning reception activities, the time and dates of up to 40 of the most recent receptions.

**PHONEBOOK**

- It lists all telephone numbers that have been stored in the machine.

**SENDING CONFIRM**

- It shows the result of the last send operation.

**SCHEDULE INFORM**

- This list shows a specific information on the documents currently stored for delayed transmission. It provides the operation number, starting time, type of operation, etc.

**SYSTEM DATA**

- This list provides a list of the user system data settings and tech mode settings.

**PROTOCOL LIST**

- This list shows the sequence of the CCITT group 3 T.30 protocol during the most recent sending or receiving operation. Use this list to check for send and receive errors. If a communication error occurs while the machine is in TECH mode, the protocol list will print automatically.

**PATTERN PRINT**

- Using this pattern printout, you can check if the printer mechanism is functioning properly. Examine the pattern and look for a break in the diagonal line. If the diagonal lines are not broken, the printer mechanism is functioning properly.

**SHADING PRIN**

- With this print, you can check the scanning elements of the CIS (Contact Image Sensor).

## 5-2-5 Engine Test Mode

The Engine test mode is used to check the operation of the components related to the printer engine.
The following test are available.

**To access the Engine Test Mode:**

1. Press Setup, #, 1, 9, 3, 1 in sequence.
2. When 'ENGINE TEST?' appears, press Start/Enter.
3. Scroll the options by pressing ◄ or ► repeatedly find the one you want.
4. Press Start/Enter to start the test.
5. Press Stop to exit the Engine test mode.

• Caution :
When you finish operating in Engine Test Mode, you must turn the power Off/On.

**Engine Test Mode Options :**

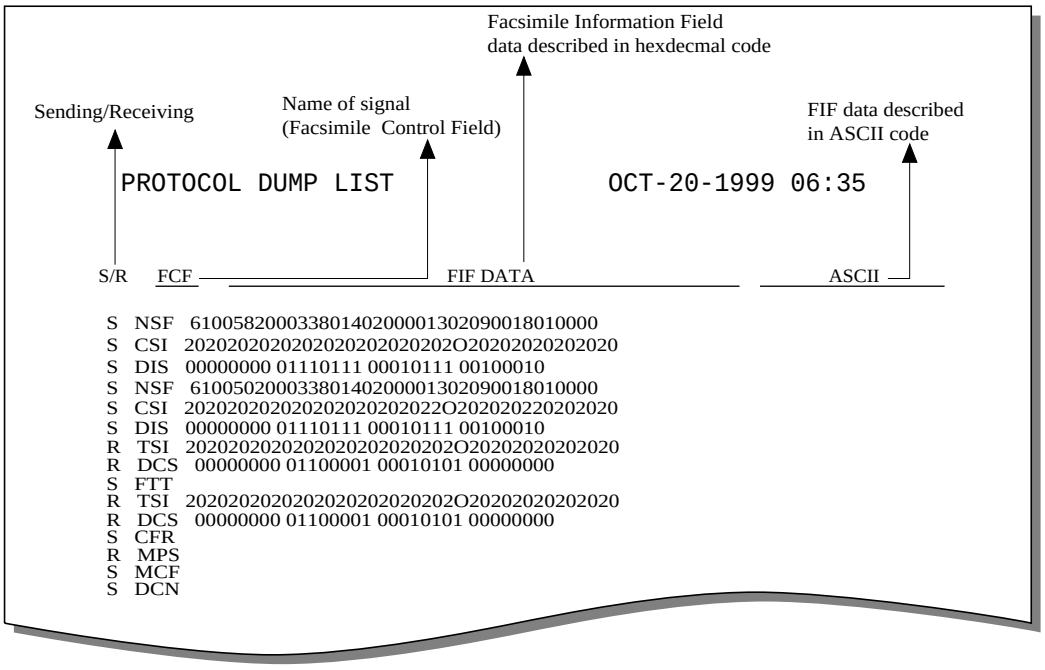
1. MAIN MOTOR TEST
2 PTL TEST
3. FAN TEST
4. FUSER TEST ( FUSER ON : 145˚C ↓ , FUSER OFF : 145˚C ↑ )
5. LSU MOTOR TEST
6. LD(LASER DIODE) TEST
7. HSYNC TEST (NG/OK)
8. LSU OPERATION TEST (NG/OK)
9. SENSOR TEST ( FEED , EXIT , PAPER EMPTY , COVER OPEN)
10. SOLENOID TEST
11. MHV TEST ( -1550 V )
12. DEV TEST ( - 430 V )
13. THV(+) TEST ( +1300 V )
14. THV(-) TEST
15. THV TRIGGER TEST
16. ALL FUNCTION TEST :
    This function is for a manufacturing press . You can test all function(1~15)
    - When you push the "Start" button, the Main Motor runs.
    - If you push the "Start" button again , the current test stops, and the next test starts.

## 5-2-6 Maintenance List

A number of reports can be printed from the fax machine within the test mode. The protocol list all contain detailed information which may be required when contacting technical support.

**To printout the protocol list :**

1. Get into the Tech mode by pressing Setup, #, 1, 9, 3, 4.
2. In Tech mode, press Report/Help.
3. Press ◄ or ► repeatedly until you find the Protocol List. When you find 'PROTOCOL LIST', press ENTER. SAMPLE OF A PROTOCOL DUMP LIST




< SAMPLE OF A PROTOCOL DUMP LIST >

# 5-3 Diagnostics

This section describes methods and procedures to isolate the cause of a malfunction in the machine. This machine displays diagnostic information on the LCD. In addition, it can perform a series of tests that allow the machine to observe individual machine functions.

## 5-3-1 Error Messages

| Error Message | Description | Solution |
|---|---|---|
| DOCUMENT JAM | The loaded document has jammed in the feeder. | Clear the document jam. |
| DOOR OPEN | The top cover is not securely latched. | Press down on the cover until it clicks in place. |
| FUSER ERROR | There occurs a problem in the fuser unit. | Unplug the power code and plug it back in. If the problem still persists, please call for service. |
| JAM/NO CARTRIDGE | Recording paper has jammed inside the unit, or the toner cartridge is not installed. | Clear the jam, or install the cartridge |
| LINE ERROR | Your unit cannot connect with the remote machine, or has lost contact because of a problem on the phone line. | Try again. If failure persists, wait an hour or so for the line to clear, then try again. Or, turn the ECM mode on. |
| LOAD DOCUMENT | You have attempted to set up a sending operation with no document loaded. | Load a document and try again. |
| LSU ERROR | There occurs a problem in the LSU (Laser Scanning Unit). | Unplug the power code and plug it back in. If the problem still persists, please call for service. |
| MEMORY FULL | The memory is full. | Either delete unnecessary documents, or retransmit after more memory becomes available, or split the transmission into more than one operation. |
| NO ANSWER | The remote machine has not answered after all the redial attempts. | Try again. Make sure the remote machine is operational. |
| NO. NOT ASSIGNED | The one-touch or speed dial location you tried to use has no number assigned to it. | Dial the number manually with the keypad, or assign a number. |

| Error Message | Description | Solution |
|---|---|---|
| NO PAPER | The recording paper has run out. | Load the recording paper. |
| OVER HEAT | The printer part in your unit has overheated. | Please wait until it cools down.<br>If you cannot solve the problem, please call for service. |
| PAPER JAM 0 | Recording paper has jammed in the paper feeding area. | Clear the jam. |
| PAPER JAM 2 | Jammed paper still remains inside the unit. | Clear the jam, or install the cartridge |
| POLLING ERROR | The remote fax machine you want to poll is not ready to respond to your poll.<br>Or When setting up to poll another fax machine, you have used an incorrect poll code. | The remote operator should know in advance that you are polling and have their fax unit loaded with the original document. Enter the correct poll code. |
| POWER FAILURE | A power failure has occurred. | If documents have been stored in the memory, a 'Power Failure Report' will be printed automatically when the power is restored. |
| RECEIVE ERROR | A fax has not been received successfully. | A problem with the facsmile communications has occurred. Ask the sender to try again. |
| RETRY REDIAL ? | The machine is waiting for a specified time interval to redial a previously busy station. | You can press **Start** to immediately redial, or **Stop** to cancel the redial operation. |
| SEND ERROR | Your fax has not gone through successfully. | A problem with the facsmile communications has occurred. Try again. |
| TONER EMPTY | The toner cartridge has run out. The machine stops. | Replace with a new toner cartridge. |
| TONER LOW | The toner is almost empty. | Take out the toner cartridge and gently shake it. Using this way, you can temporarily re-establish the print quality. |
| WARMING UP | The printer is warming up and is off-line. | Wait until the printer is on-line. |

## 5-4 Print Quality

| No | Roller | Abnormal image period | Kind of abnormal image |
|---|---|---|---|
| 1 | OPC Drum | 75.4mm | •White spot on black image<br>•Black spot |
| 2 | Charge Roller | 37.7mm | Black spot |
| 3 | Supply Roller | 26.8mm | Horizontal density band |
| 4 | Develope Roller | 31.6mm | Horizontal density band |
| 5 | Transfer Roller | 47.1mm | Black side contamination/transfer fault |
| 6 | Heat Roller | 50.1mm | Black spot, White spot |
| 7 | Pressure Roller | 50.2mm | Black side contamination |

## 5-5 Note for replacing Main board

When you replace the main board to new one, the information on the toner state is cleared. Therefore, you should update the information to the new board by entering the exact value of total toner count and specifying the toner cartridge installed currently is shipped with the machine or new. If not, 'TONER LOW/EMPTY' message may not appear when the toner is run out.

1. In Tech mode, print 'SYSTEM DATA LIST'. The list includes the total toner count and CRU state information.

   • TOTAL TONER COUNT: The total number of the dots used to print up to current time.

   • CRU STATE: The page number which the toner cartridge can print. (The yield of a new toner cartridge is approximately 2,500 pages and that of the cartridge supplied with the machine is approximately 1.000 pages.)

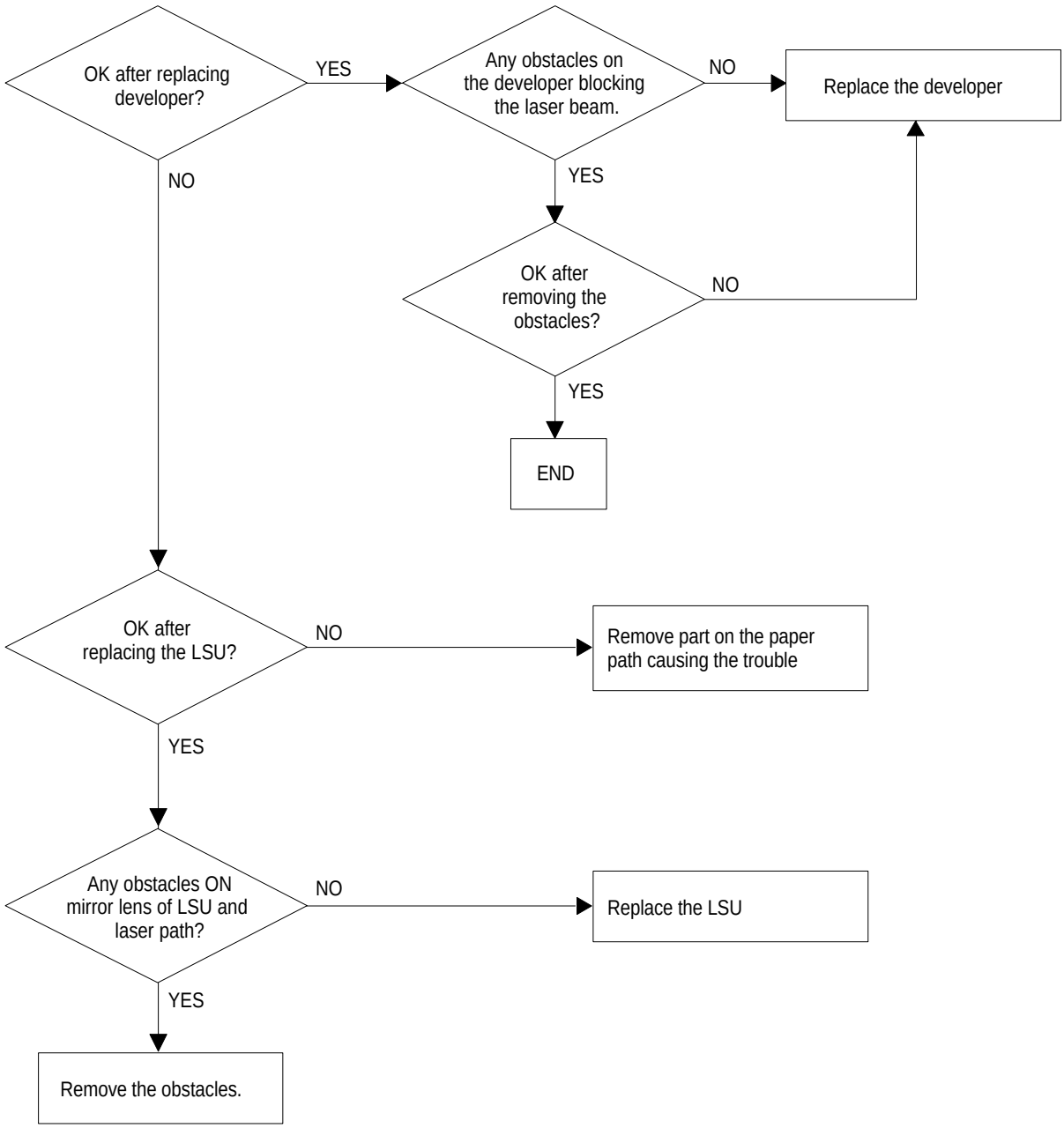
2. Replace Main board.

3. In Tech mode,
   3-1) Press Setup, and find 'MAINTENANCE' by pressing repeatedly ◄ or► , then press Start/Enter.
   3-2) When 'TONER COUNT' is displayed in LCD, press Start/Enter, and enter the value of the total toner count in the system data list.
   3-3) When you are prompted to enter CRU STATE, press Start/Enter.
   3-4) When you see '[1.1000 2.2300]' in LCD, select the value of the CRU state in the system data list.

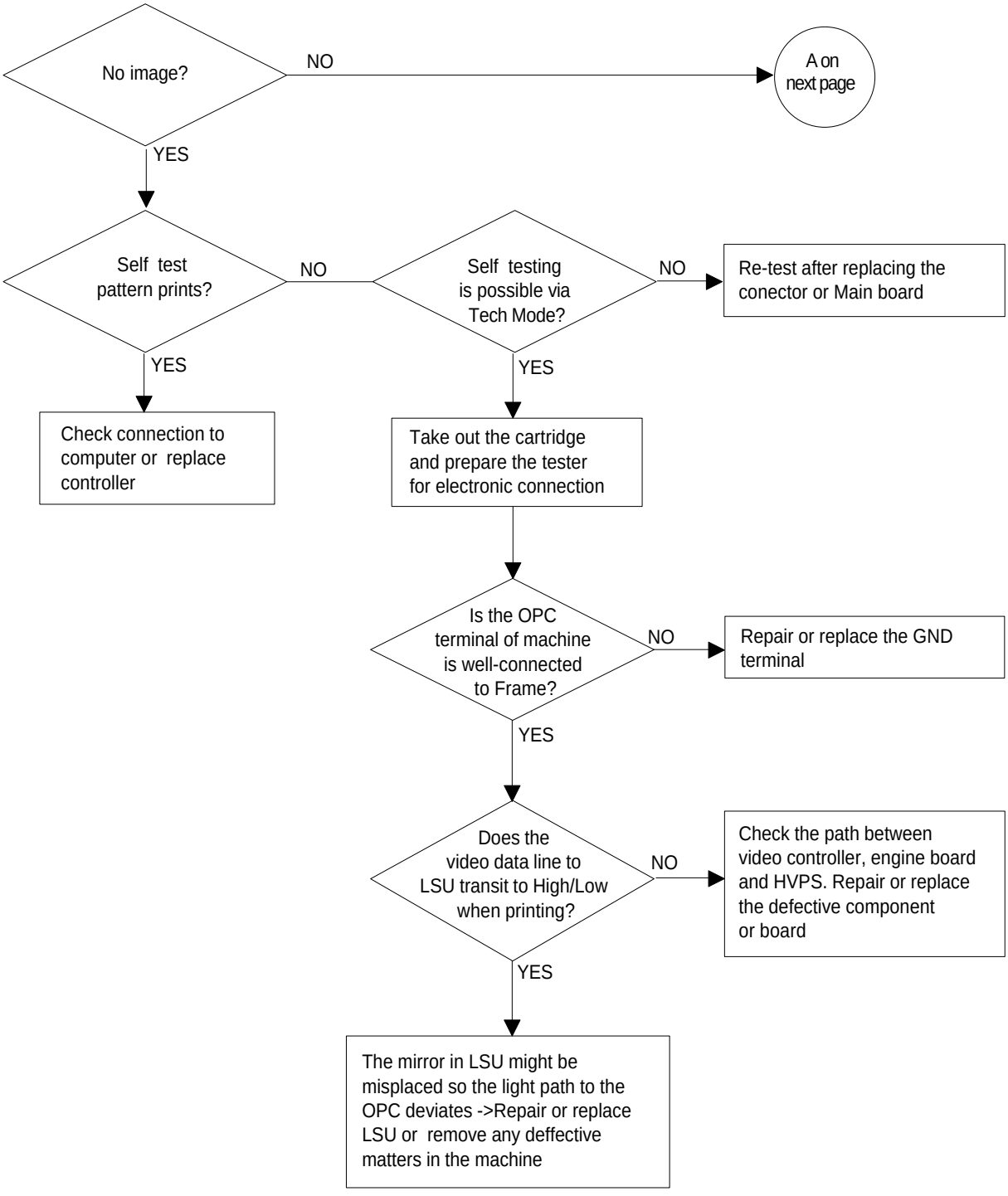
4. In Tech mode, print 'SYSTEM DATA LIST' and make sure that the toner information is updated.

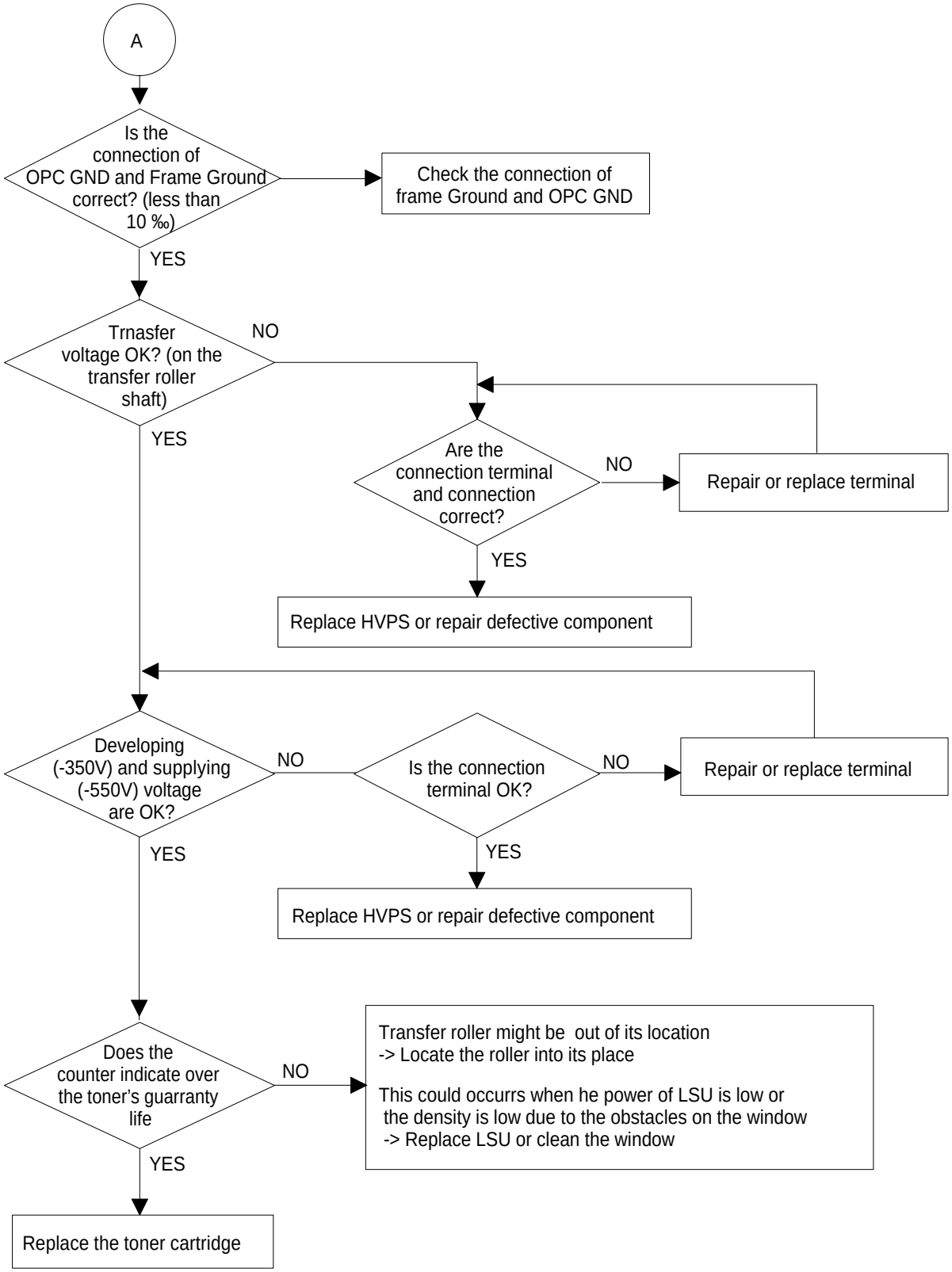
# 5-6 Troubleshooting Flow Chart

## Vertical black line and band

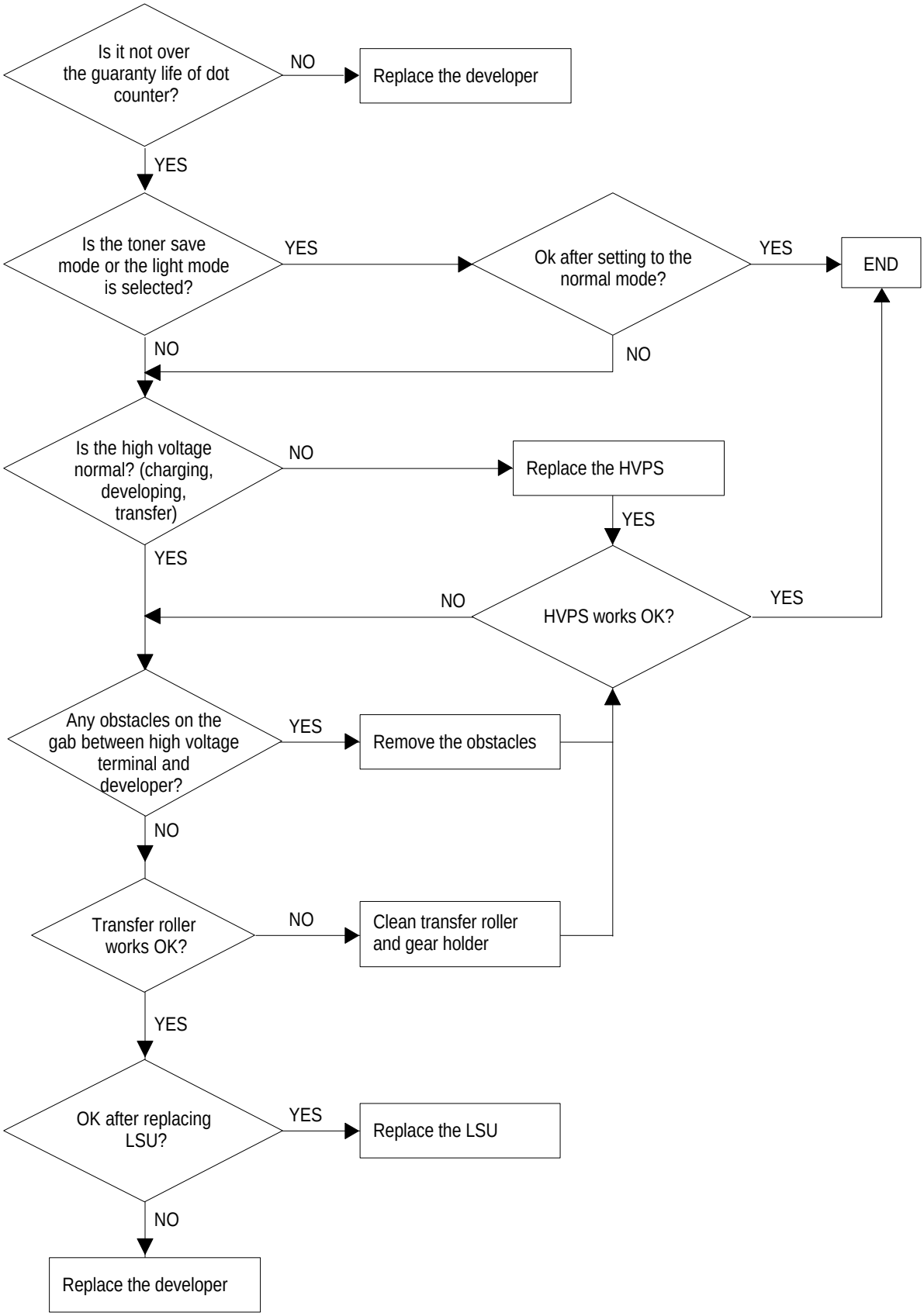


## No Image

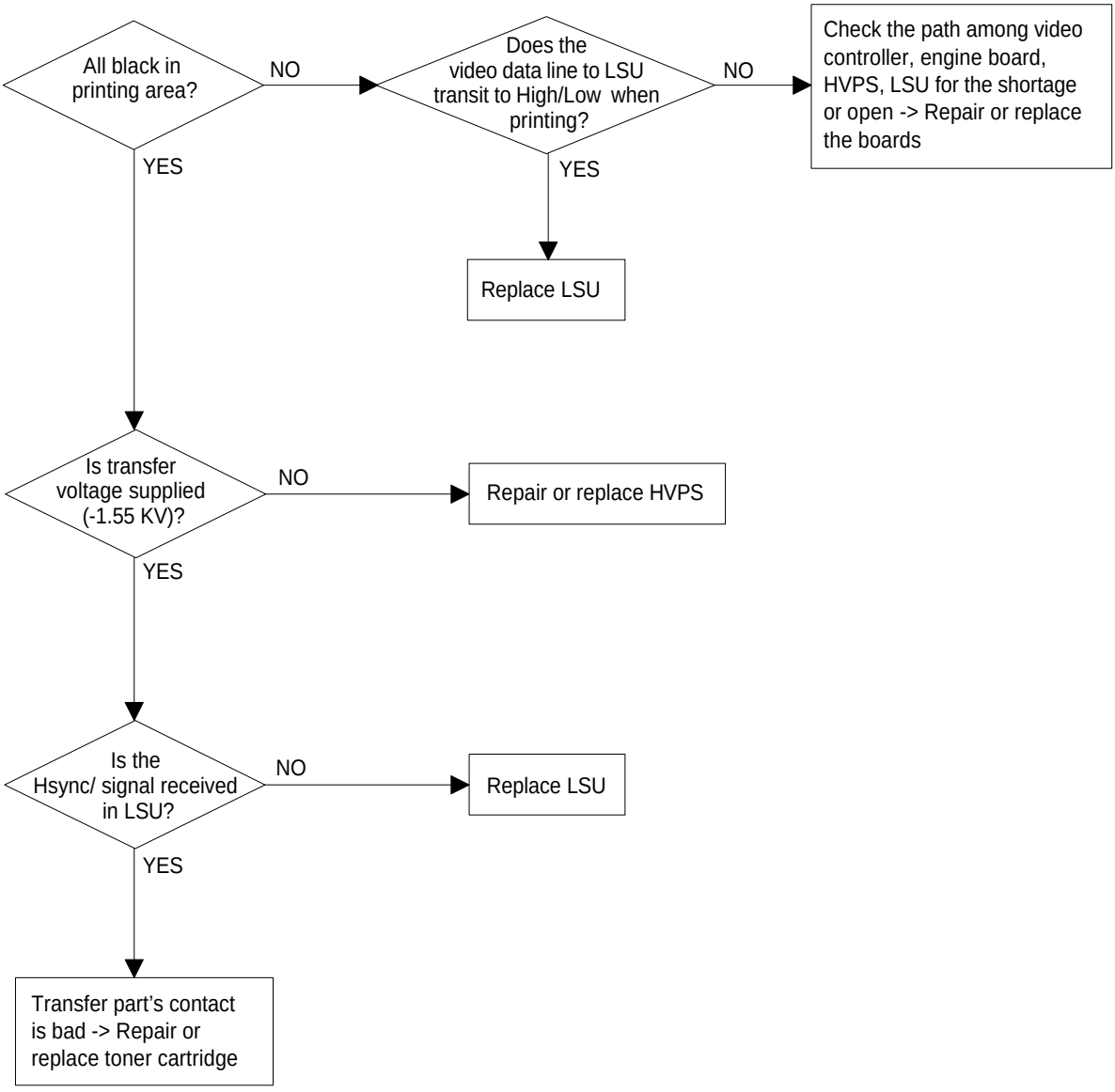

No image?
NO
A on next page
YES
Self test pattern prints?
NO
Self testing is possible via Tech Mode?
NO
Re-test after replacing the conector or Main board
YES
YES
Check connection to computer or replace controller
Take out the cartridge and prepare the tester for electronic connection
Is the OPC terminal of machine is well-connected to Frame?
NO
Repair or replace the GND terminal
YES
Does the video data line to LSU transit to High/Low when printing?
NO
Check the path between video controller, engine board and HVPS. Repair or replace the defective component or board
YES
The mirror in LSU might be misplaced so the light path to the OPC deviates ->Repair or replace LSU or remove any deffective matters in the machine


A
Is the connection of OPC GND and Frame Ground correct? (less than 10 ‰)
Check the connection of frame Ground and OPC GND
YES
Trnasfer voltage OK? (on the transfer roller shaft)
NO
YES
Are the connection terminal and connection correct?
NO
Repair or replace terminal
YES
Replace HVPS or repair defective component
Developing (-350V) and supplying (-550V) voltage are OK?
NO
Is the connection terminal OK?
NO
Repair or replace terminal
YES
YES
Replace HVPS or repair defective component
Does the counter indicate over the toner's guarranty life
NO
Transfer roller might be out of its location
-> Locate the roller into its place
This could occurrs when he power of LSU is low or the density is low due to the obstacles on the window
-> Replace LSU or clean the window
YES
Replace the toner cartridge

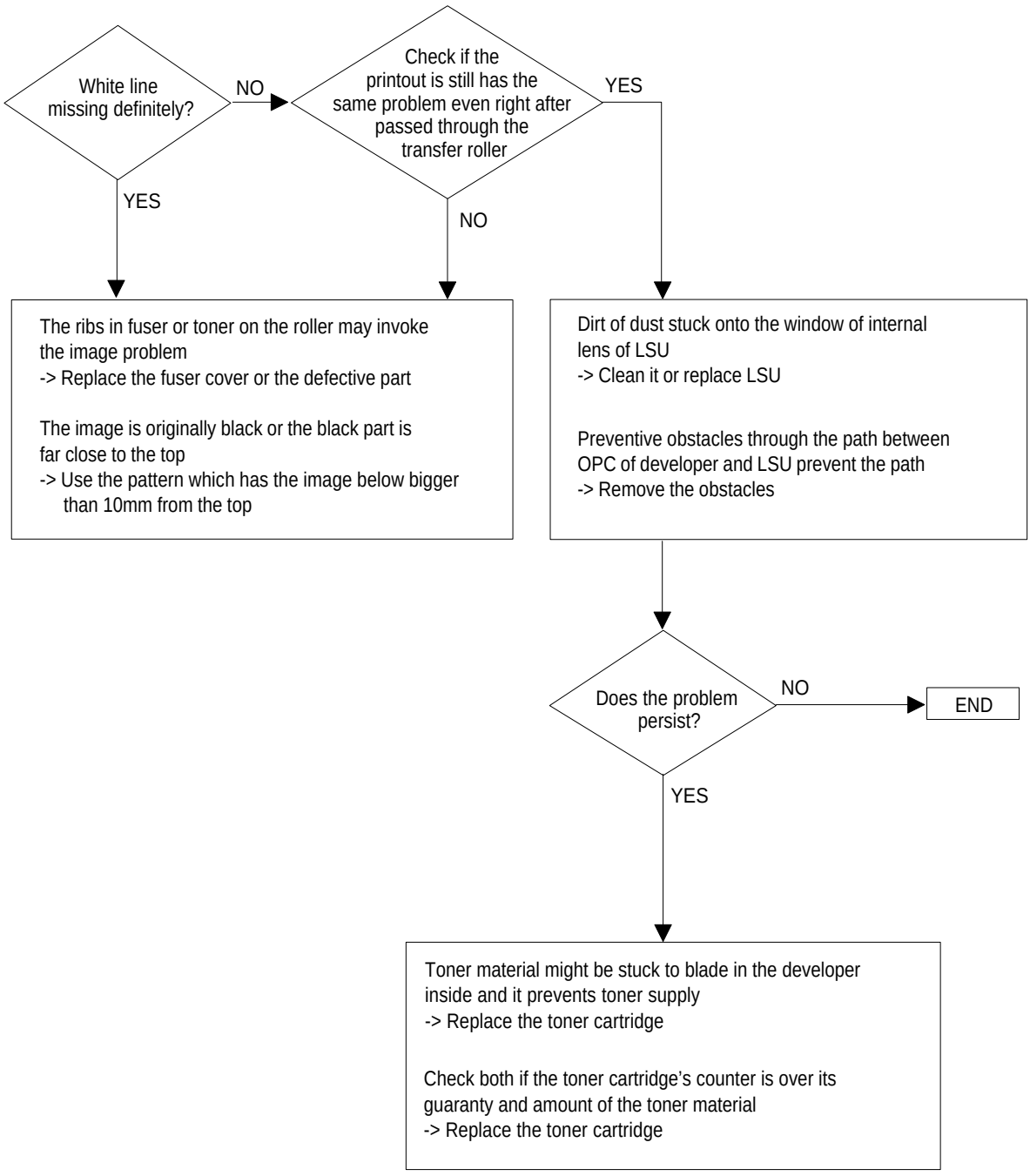
## Light image


Is it not over the guaranty life of dot counter?
NO
Replace the developer
YES
Is the toner save mode or the light mode is selected?
YES
Ok after setting to the normal mode?
YES
END
NO
NO
Is the high voltage normal? (charging, developing, transfer)
NO
Replace the HVPS
YES
YES
NO
HVPS works OK?
YES
Any obstacles on the gab between high voltage terminal and developer?
YES
Remove the obstacles
NO
Transfer roller works OK?
NO
Clean transfer roller and gear holder
YES
OK after replacing LSU?
YES
Replace the LSU
NO
Replace the developer

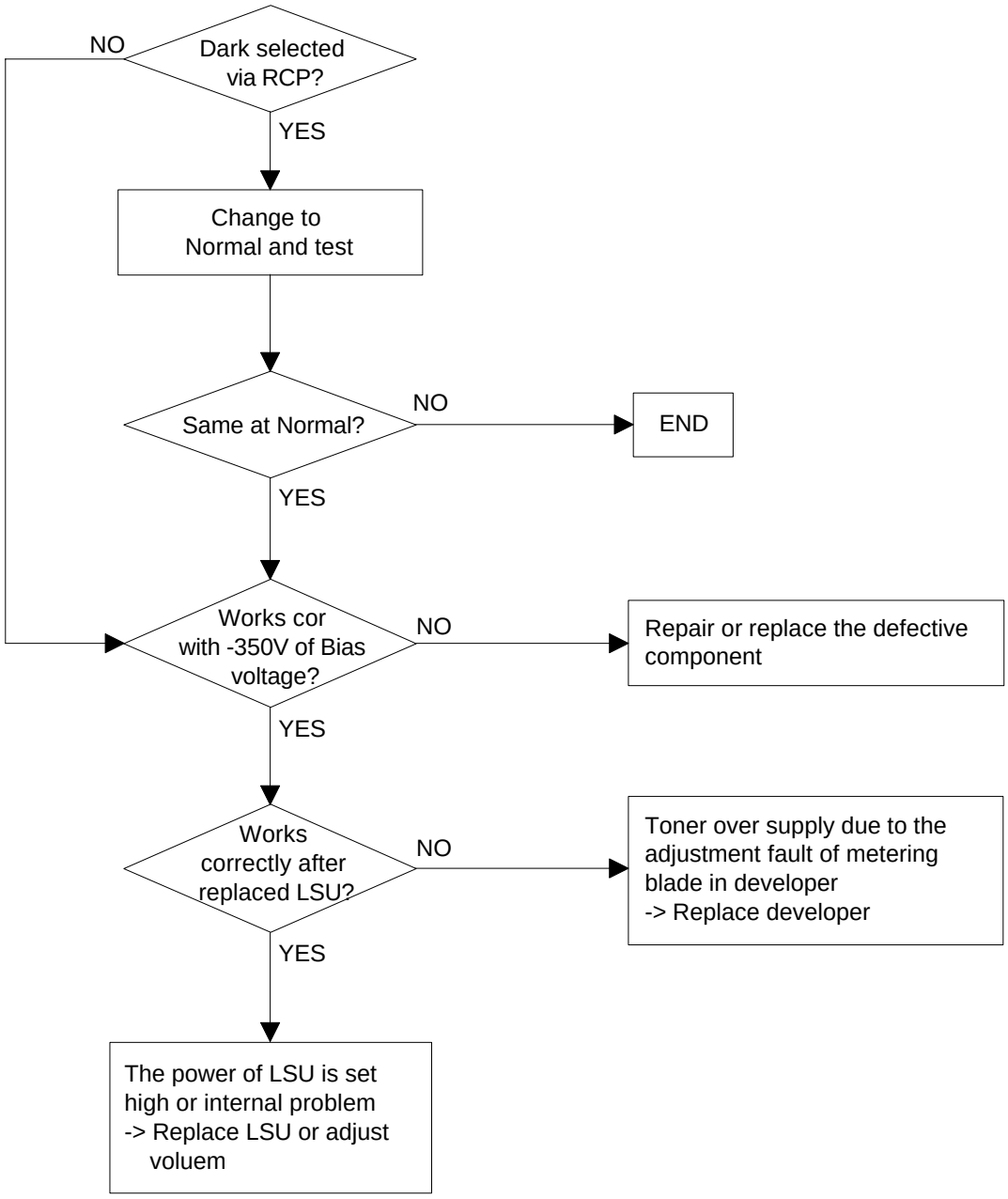
## All Black


All black in printing area?
NO
Does the video data line to LSU transit to High/Low when printing?
NO
Check the path among video controller, engine board, HVPS, LSU for the shortage or open -> Repair or replace the boards
YES
YES
Replace LSU
Is transfer voltage supplied (-1.55 KV)?
NO
Repair or replace HVPS
YES
Is the Hsync/ signal received in LSU?
NO
Replace LSU
YES
Transfer part's contact is bad -> Repair or replace toner cartridge

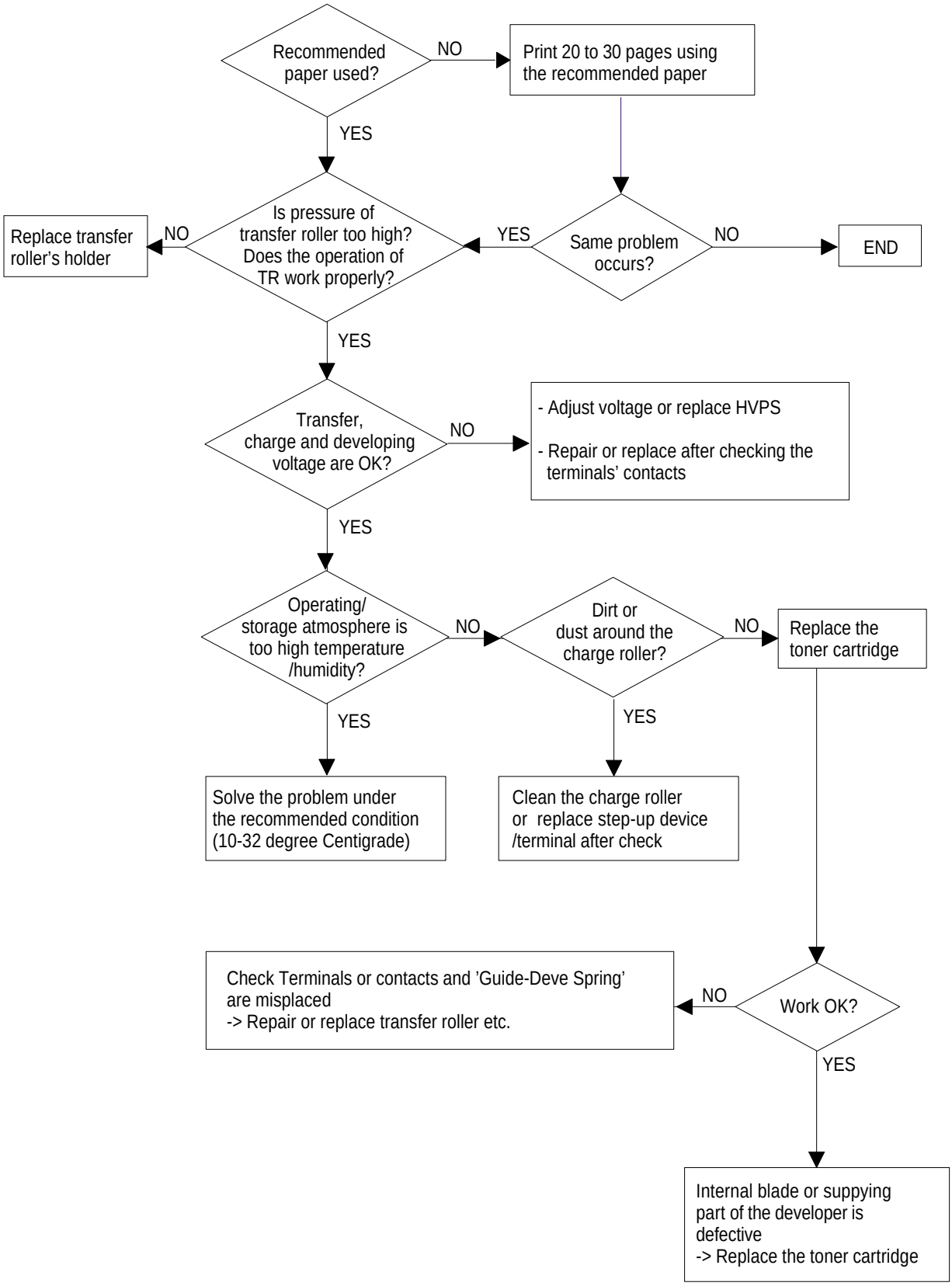
## Vertical White Line (Band)


White line missing definitely?
NO
Check if the printout is still has the same problem even right after passed through the transfer roller
YES
YES
NO
The ribs in fuser or toner on the roller may invoke the image problem
-> Replace the fuser cover or the defective part
The image is originally black or the black part is far close to the top
-> Use the pattern which has the image below bigger than 10mm from the top
Dirt of dust stuck onto the window of internal lens of LSU
-> Clean it or replace LSU
Preventive obstacles through the path between OPC of developer and LSU prevent the path
-> Remove the obstacles
Does the problem persist?
NO
END
YES
Toner material might be stuck to blade in the developer inside and it prevents toner supply
-> Replace the toner cartridge
Check both if the toner cartridge's counter is over its guaranty and amount of the toner material
-> Replace the toner cartridge

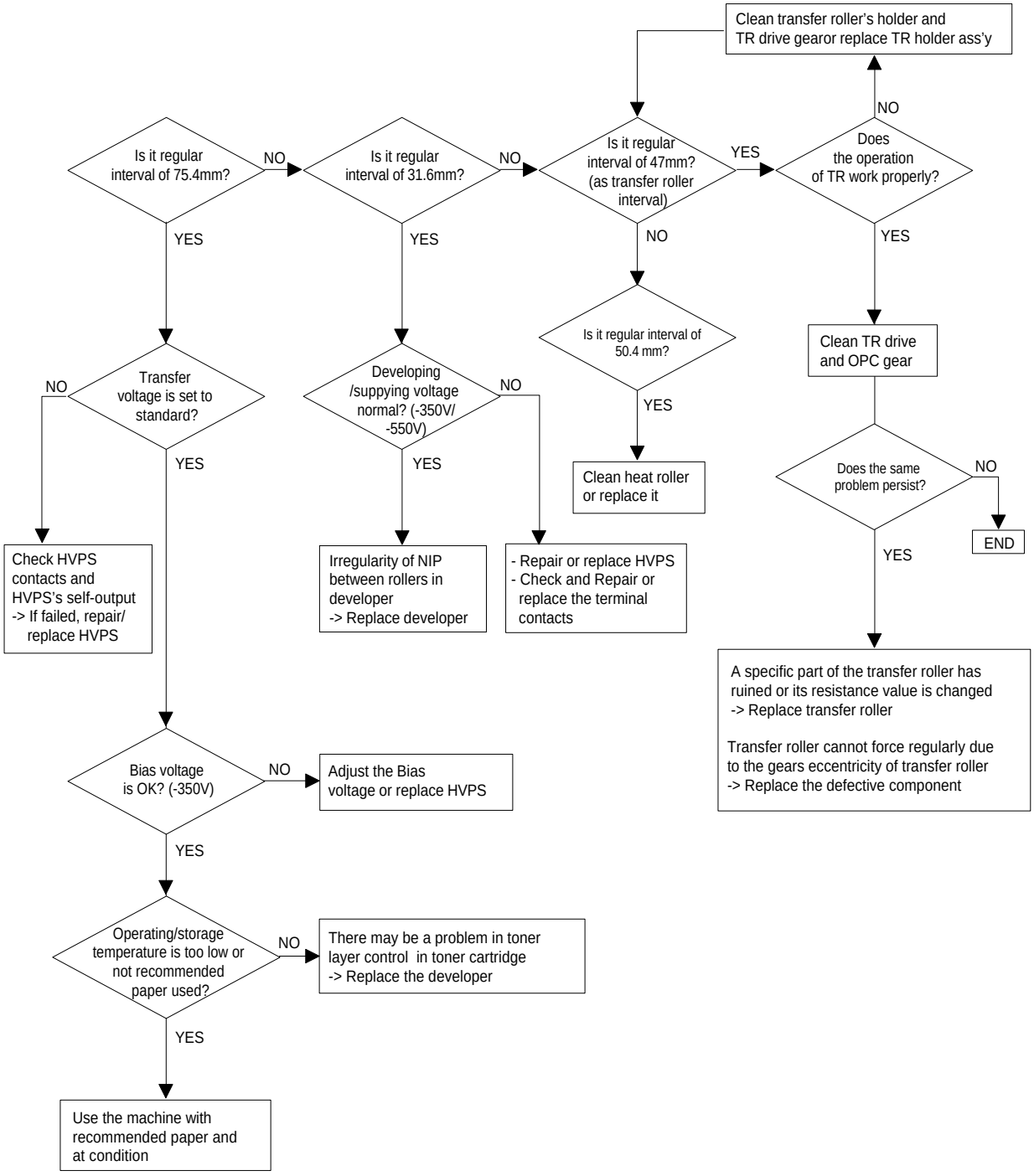
## Dark Image


Dark selected via RCP?
NO
YES
Change to Normal and test
Same at Normal?
NO
END
YES
Works cor with -350V of Bias voltage?
NO
Repair or replace the defective component
YES
Works correctly after replaced LSU?
NO
Toner over supply due to the adjustment fault of metering blade in developer
-> Replace developer
YES
The power of LSU is set high or internal problem
-> Replace LSU or adjust voluem

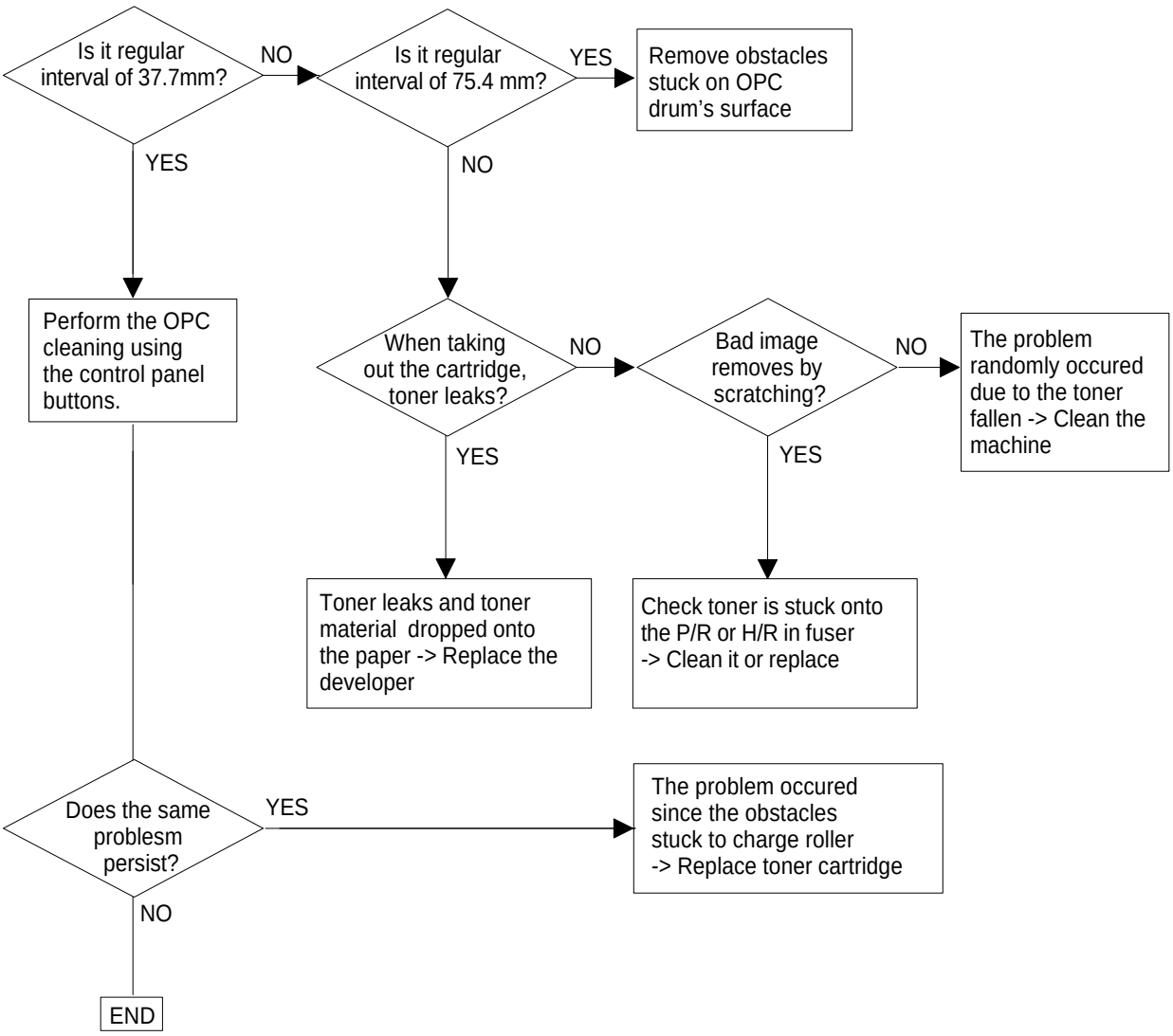
## Background


Recommended paper used?
NO
Print 20 to 30 pages using the recommended paper
YES
Is pressure of transfer roller too high? Does the operation of TR work properly?
NO
Replace transfer roller's holder
YES
Same problem occurs?
NO
END
YES
Transfer, charge and developing voltage are OK?
NO
- Adjust voltage or replace HVPS
- Repair or replace after checking the terminals' contacts
YES
Operating/ storage atmosphere is too high temperature /humidity?
NO
Dirt or dust around the charge roller?
NO
Replace the toner cartridge
YES
YES
Solve the problem under the recommended condition (10-32 degree Centigrade)
Clean the charge roller or replace step-up device /terminal after check
Check Terminals or contacts and 'Guide-Deve Spring' are misplaced
-> Repair or replace transfer roller etc.
NO
Work OK?
YES
Internal blade or suppying part of the developer is defective
-> Replace the toner cartridge

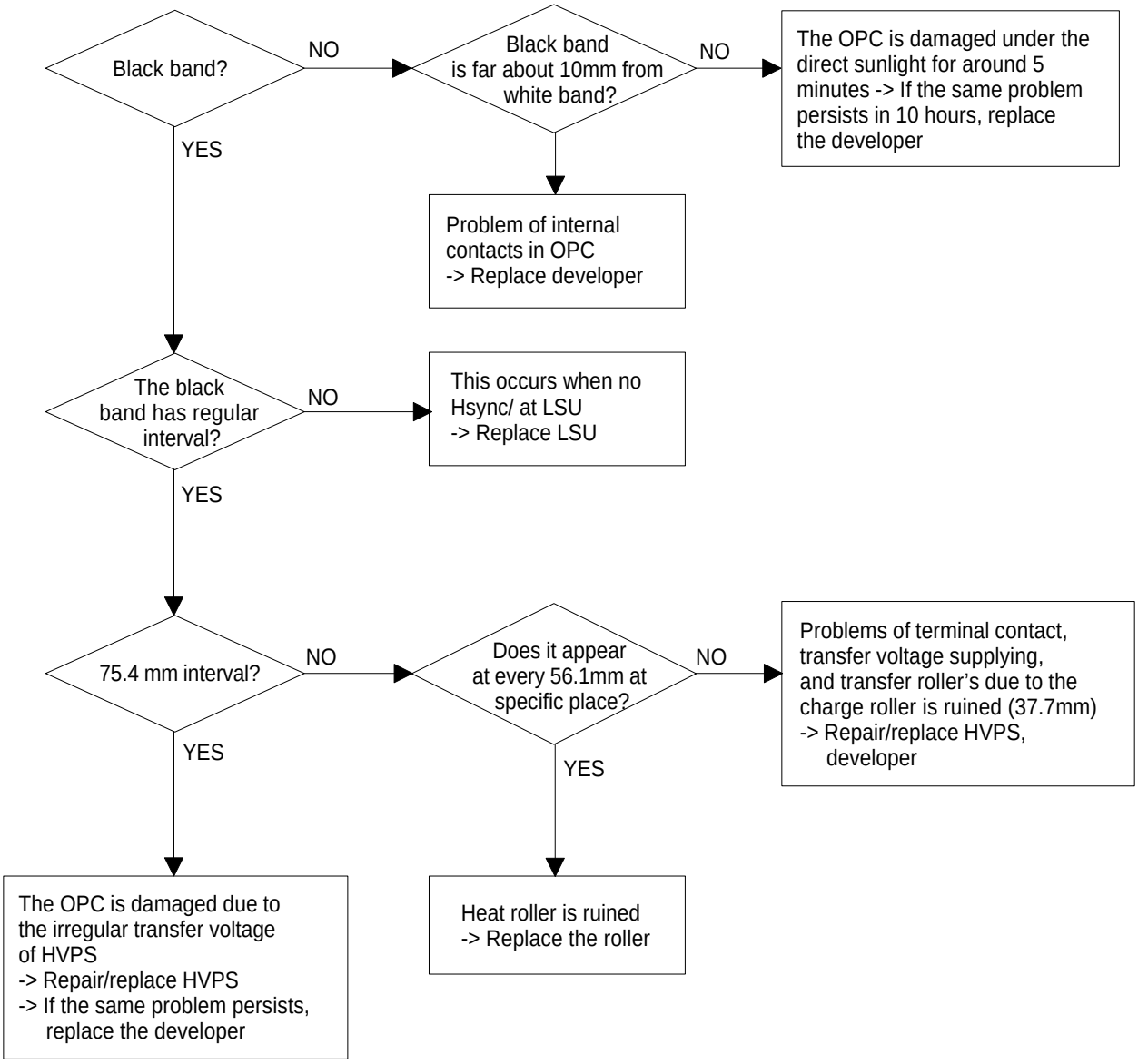
## Ghost


Clean transfer roller's holder and TR drive gearor replace TR holder ass'y
Is it regular interval of 75.4mm?
NO
Is it regular interval of 31.6mm?
NO
Is it regular interval of 47mm? (as transfer roller interval)
YES
Does the operation of TR work properly?
NO
YES
YES
YES
NO
YES
Transfer voltage is set to standard?
NO
YES
Developing /suppying voltage normal? (-350V/ -550V)
NO
YES
Is it regular interval of 50.4 mm?
YES
Clean TR drive and OPC gear
Does the same problem persist?
NO
END
YES
Clean heat roller or replace it
Check HVPS contacts and HVPS's self-output -> If failed, repair/ replace HVPS
Irregularity of NIP between rollers in developer -> Replace developer
- Repair or replace HVPS
- Check and Repair or replace the terminal contacts
A specific part of the transfer roller has ruined or its resistance value is changed -> Replace transfer roller
Transfer roller cannot force regularly due to the gears eccentricity of transfer roller -> Replace the defective component
Bias voltage is OK? (-350V)
NO
Adjust the Bias voltage or replace HVPS
YES
Operating/storage temperature is too low or not recommended paper used?
NO
There may be a problem in toner layer control in toner cartridge -> Replace the developer
YES
Use the machine with recommended paper and at condition

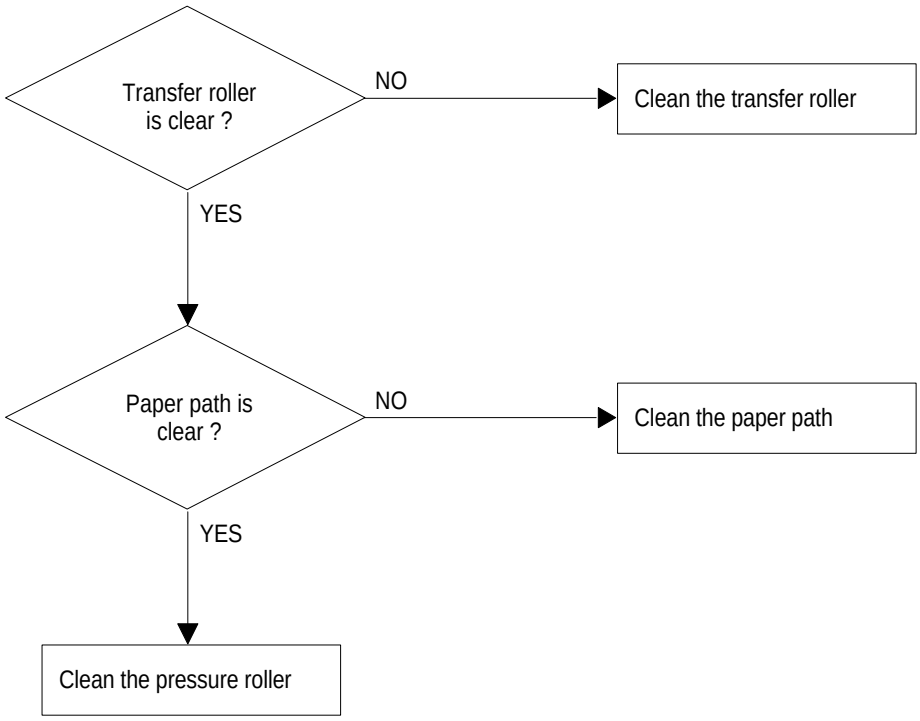
## Black Spot


Is it regular interval of 37.7mm?
NO
Is it regular interval of 75.4 mm?
YES
Remove obstacles stuck on OPC drum's surface
YES
NO
Perform the OPC cleaning using the control panel buttons.
When taking out the cartridge, toner leaks?
NO
Bad image removes by scratching?
NO
The problem randomly occured due to the toner fallen -> Clean the machine
YES
YES
Toner leaks and toner material dropped onto the paper -> Replace the developer
Check toner is stuck onto the P/R or H/R in fuser -> Clean it or replace
Does the same problesm persist?
YES
The problem occured since the obstacles stuck to charge roller -> Replace toner cartridge
NO
END

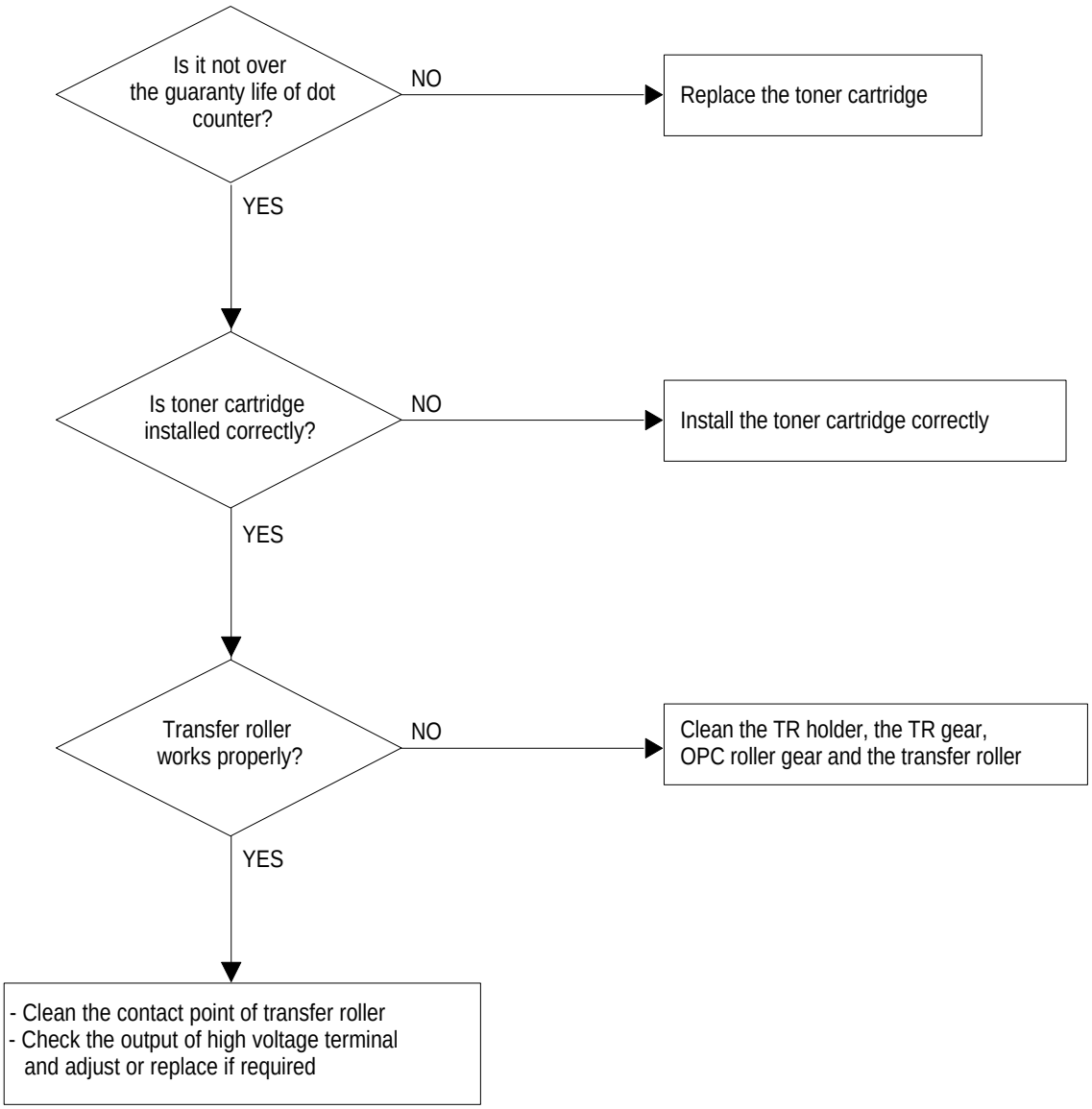
## Horizontal Band


Black band?
NO
Black band is far about 10mm from white band?
NO
The OPC is damaged under the direct sunlight for around 5 minutes -> If the same problem persists in 10 hours, replace the developer
YES
Problem of internal contacts in OPC -> Replace developer
The black band has regular interval?
NO
This occurs when no Hsync/ at LSU -> Replace LSU
YES
75.4 mm interval?
NO
Does it appear at every 56.1mm at specific place?
NO
Problems of terminal contact, transfer voltage supplying, and transfer roller's due to the charge roller is ruined (37.7mm) -> Repair/replace HVPS, developer
YES
YES
The OPC is damaged due to the irregular transfer voltage of HVPS -> Repair/replace HVPS -> If the same problem persists, replace the developer
Heat roller is ruined -> Replace the roller

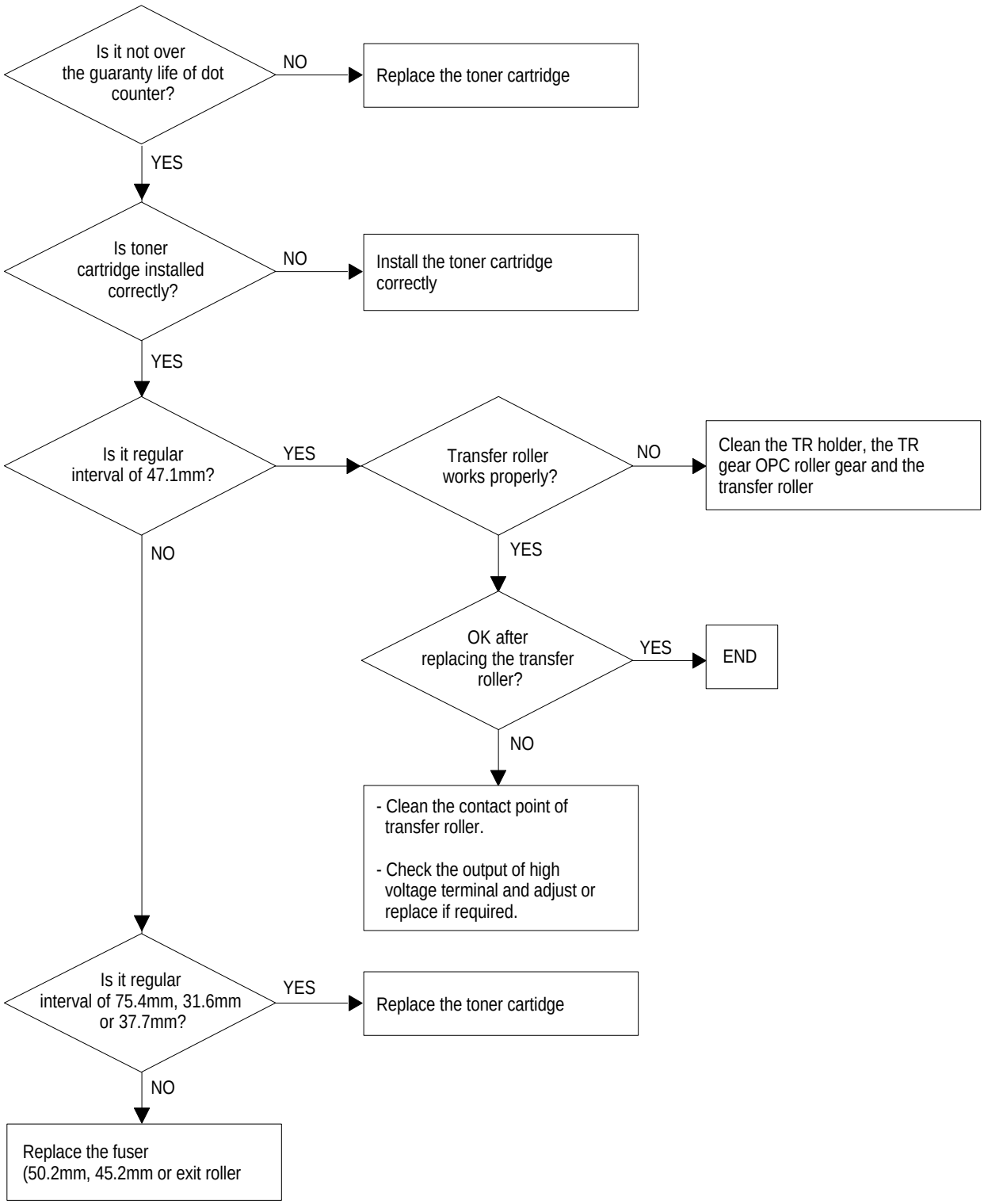
## Toner Contaminations on Back of Paper



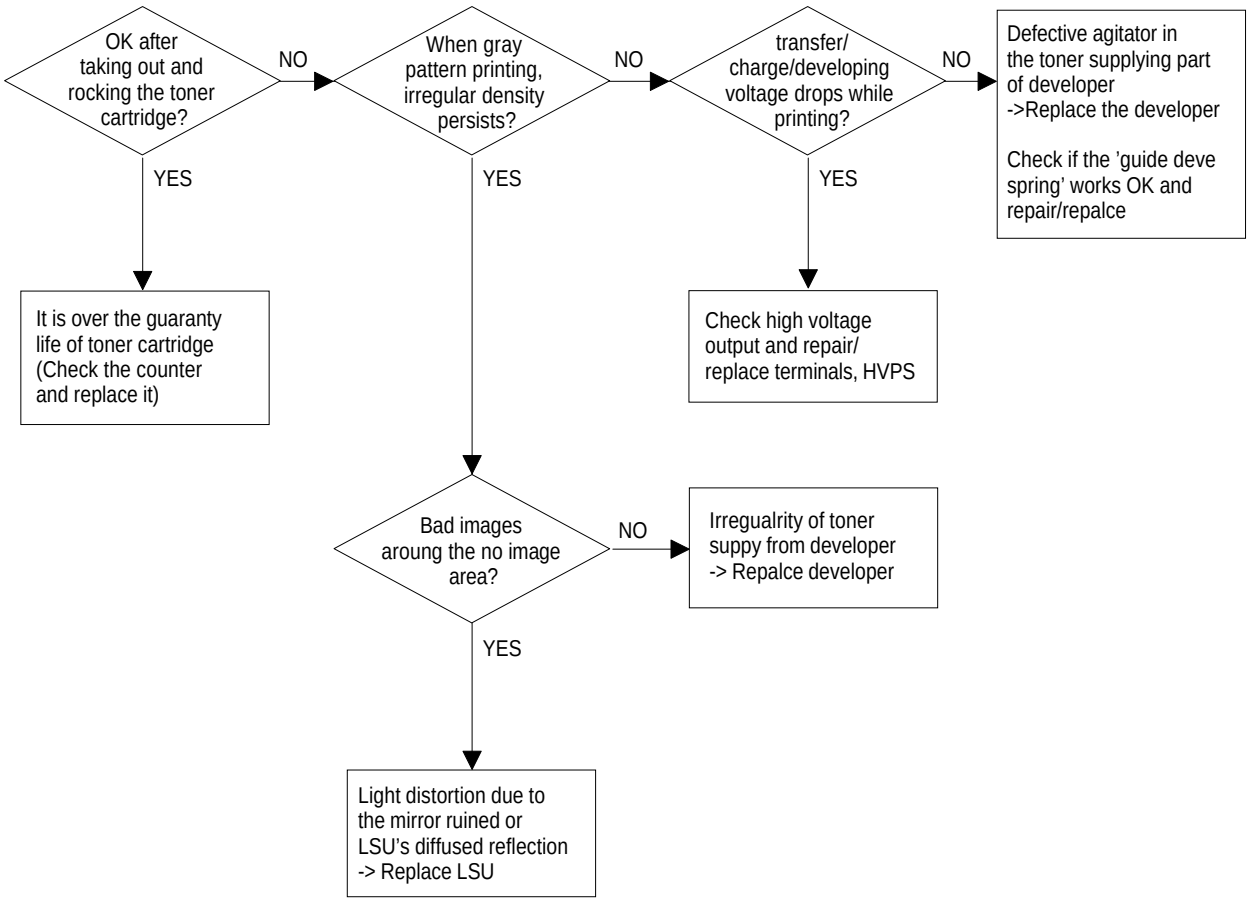
## Partial Blank Image (not Periodic)


Is it not over the guaranty life of dot counter?
NO
Replace the toner cartridge
YES
Is toner cartridge installed correctly?
NO
Install the toner cartridge correctly
YES
Transfer roller works properly?
NO
Clean the TR holder, the TR gear, OPC roller gear and the transfer roller
YES
- Clean the contact point of transfer roller
- Check the output of high voltage terminal and adjust or replace if required

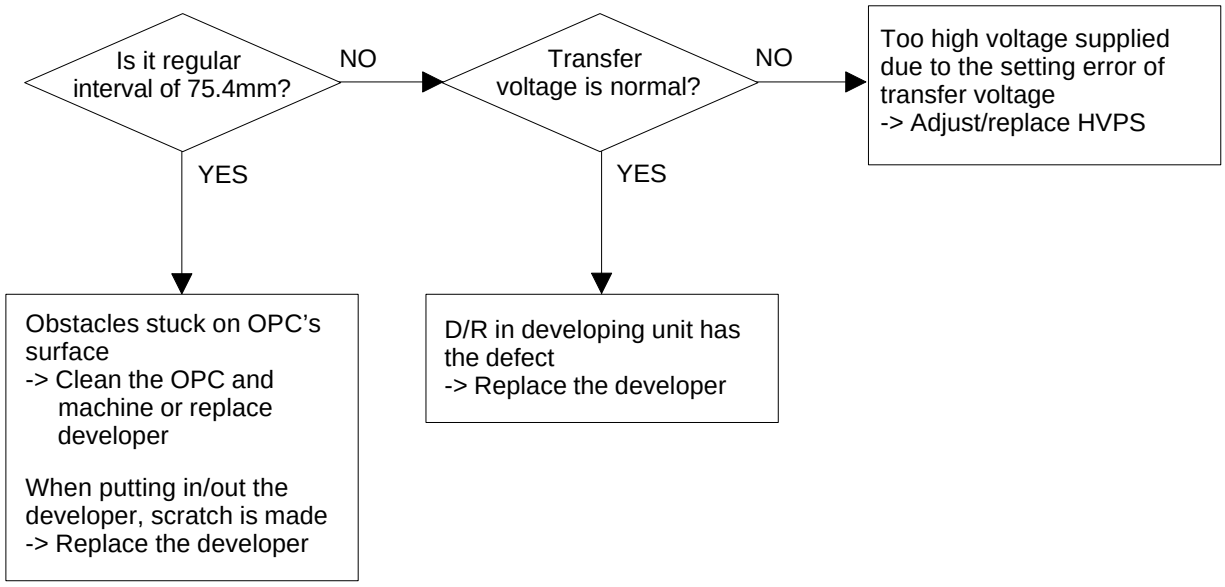
## Partial Blank Image (Periodic)


Is it not over the guaranty life of dot counter?
NO
Replace the toner cartridge
YES
Is toner cartridge installed correctly?
NO
Install the toner cartridge correctly
YES
Is it regular interval of 47.1mm?
YES
Transfer roller works properly?
NO
Clean the TR holder, the TR gear OPC roller gear and the transfer roller
NO
YES
OK after replacing the transfer roller?
YES
END
NO
- Clean the contact point of transfer roller.
- Check the output of high voltage terminal and adjust or replace if required.
Is it regular interval of 75.4mm, 31.6mm or 37.7mm?
YES
Replace the toner cartidge
NO
Replace the fuser (50.2mm, 45.2mm or exit roller

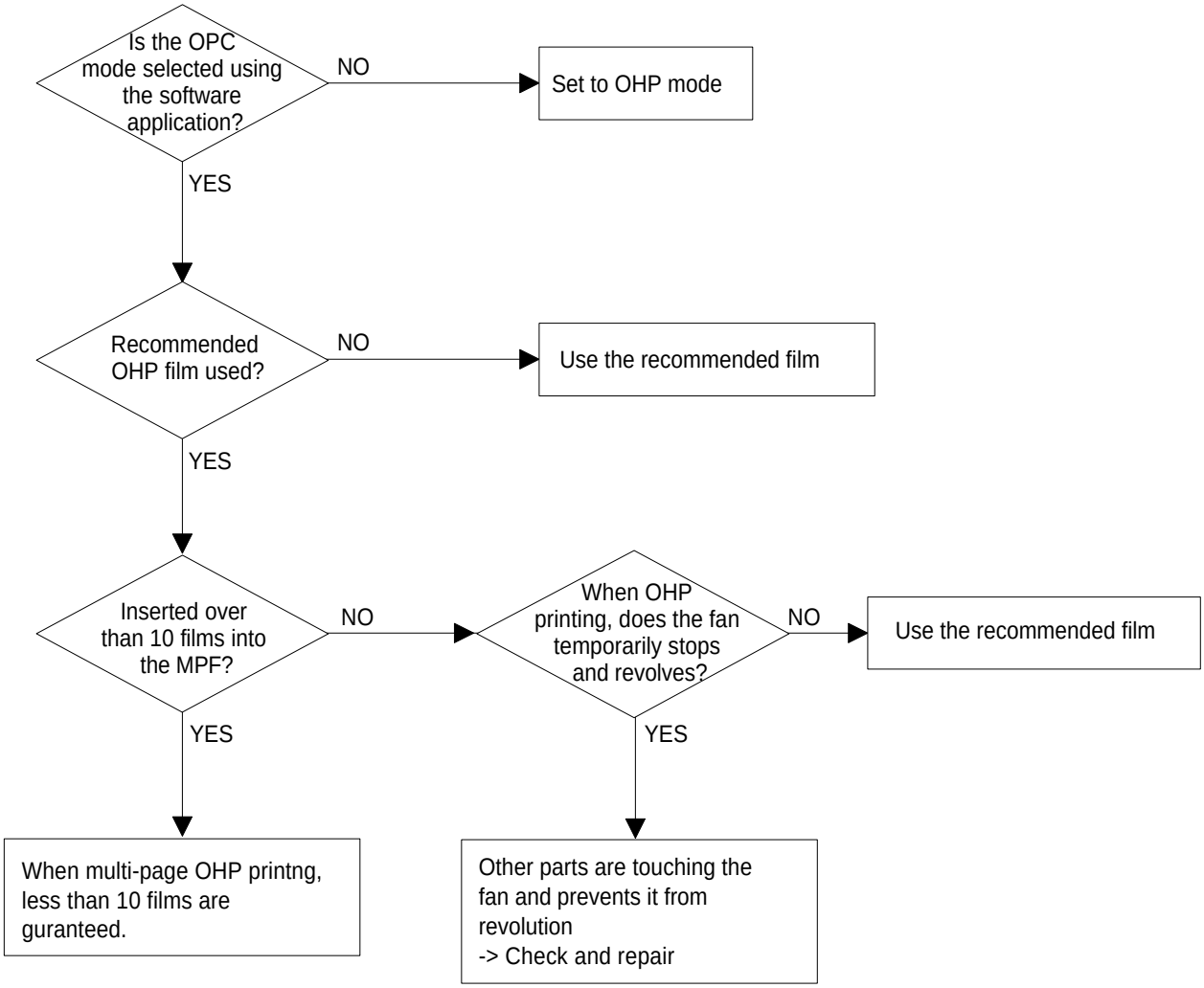
## Irregular Density


OK after taking out and rocking the toner cartridge?
NO
When gray pattern printing, irregular density persists?
NO
transfer/ charge/developing voltage drops while printing?
NO
Defective agitator in the toner supplying part of developer
->Replace the developer
Check if the 'guide deve spring' works OK and repair/repalce
YES
It is over the guaranty life of toner cartridge (Check the counter and replace it)
YES
Check high voltage output and repair/ replace terminals, HVPS
YES
Bad images aroung the no image area?
NO
Irregualrity of toner suppy from developer
-> Repalce developer
YES
Light distortion due to the mirror ruined or LSU's diffused reflection
-> Replace LSU

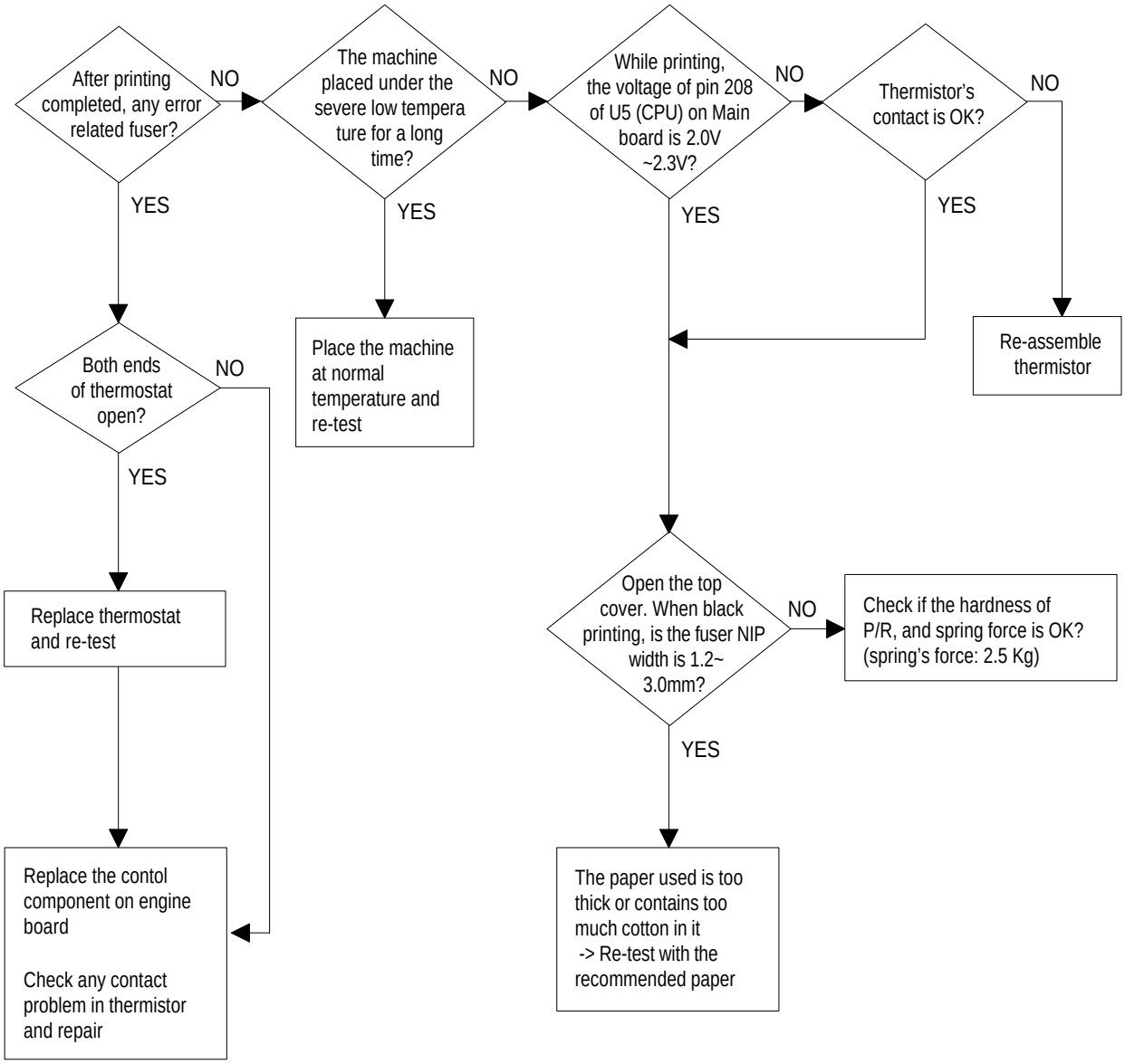
## White Spot


Is it regular interval of 75.4mm?
NO
Transfer voltage is normal?
NO
Too high voltage supplied due to the setting error of transfer voltage
-> Adjust/replace HVPS
YES
YES
Obstacles stuck on OPC's surface
-> Clean the OPC and machine or replace developer
When putting in/out the developer, scratch is made
-> Replace the developer
D/R in developing unit has the defect
-> Replace the developer

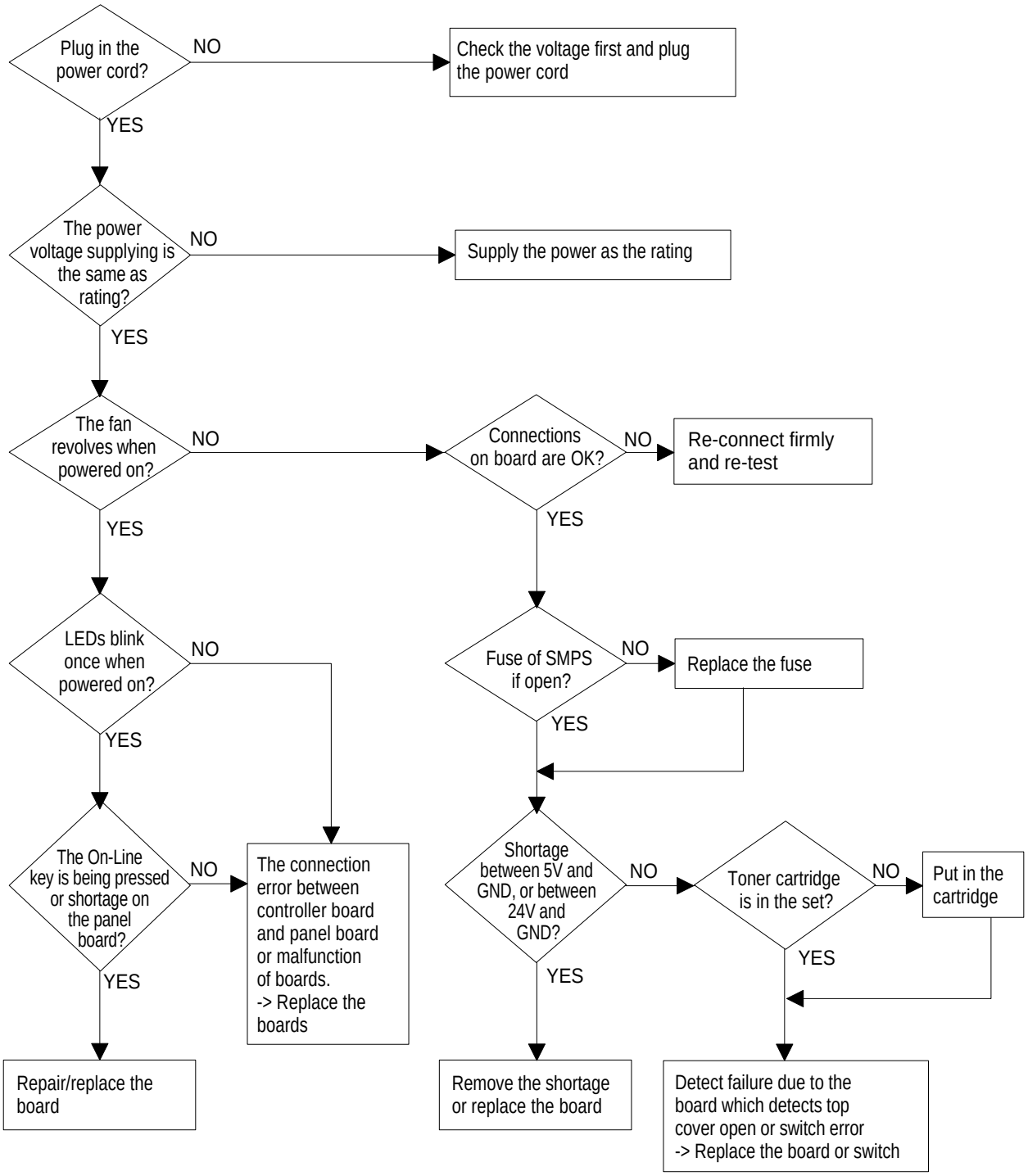
## Trembling at the End When OHP Printing


Is the OPC mode selected using the software application?
NO
Set to OHP mode
YES
Recommended OHP film used?
NO
Use the recommended film
YES
Inserted over than 10 films into the MPF?
NO
When OHP printing, does the fan temporarily stops and revolves?
NO
Use the recommended film
YES
YES
When multi-page OHP printng, less than 10 films are guranteed.
Other parts are touching the fan and prevents it from revolution
-> Check and repair

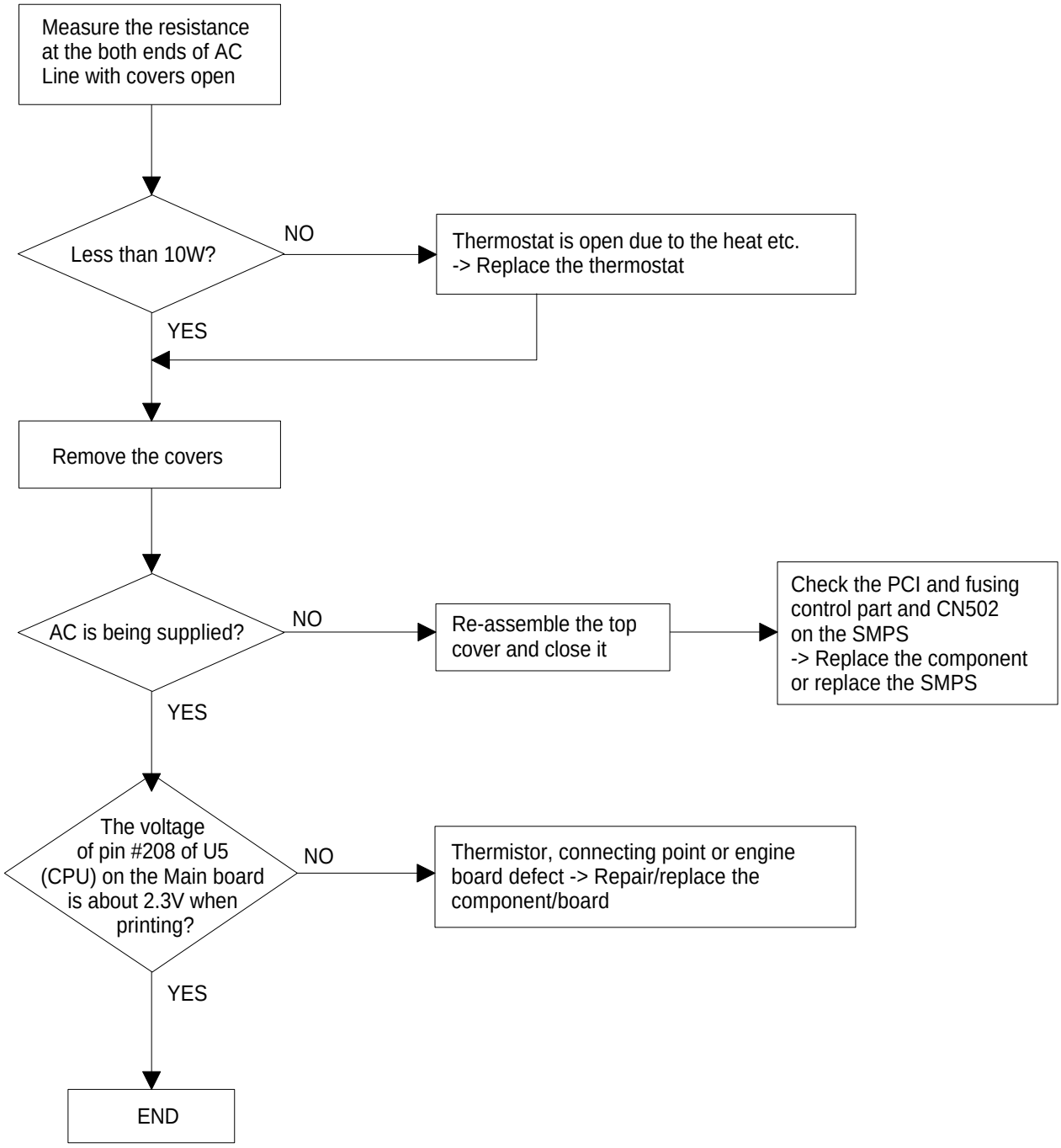
## Poor Fusing Grade


After printing completed, any error related fuser?
NO
The machine placed under the severe low tempera ture for a long time?
NO
While printing, the voltage of pin 208 of U5 (CPU) on Main board is 2.0V ~2.3V?
NO
Thermistor's contact is OK?
NO
YES
YES
YES
YES
Re-assemble thermistor
Place the machine at normal temperature and re-test
Both ends of thermostat open?
NO
YES
Replace thermostat and re-test
Replace the contol component on engine board
Check any contact problem in thermistor and repair
Open the top cover. When black printing, is the fuser NIP width is 1.2~ 3.0mm?
NO
Check if the hardness of P/R, and spring force is OK? (spring's force: 2.5 Kg)
YES
The paper used is too thick or contains too much cotton in it
-> Re-test with the recommended paper

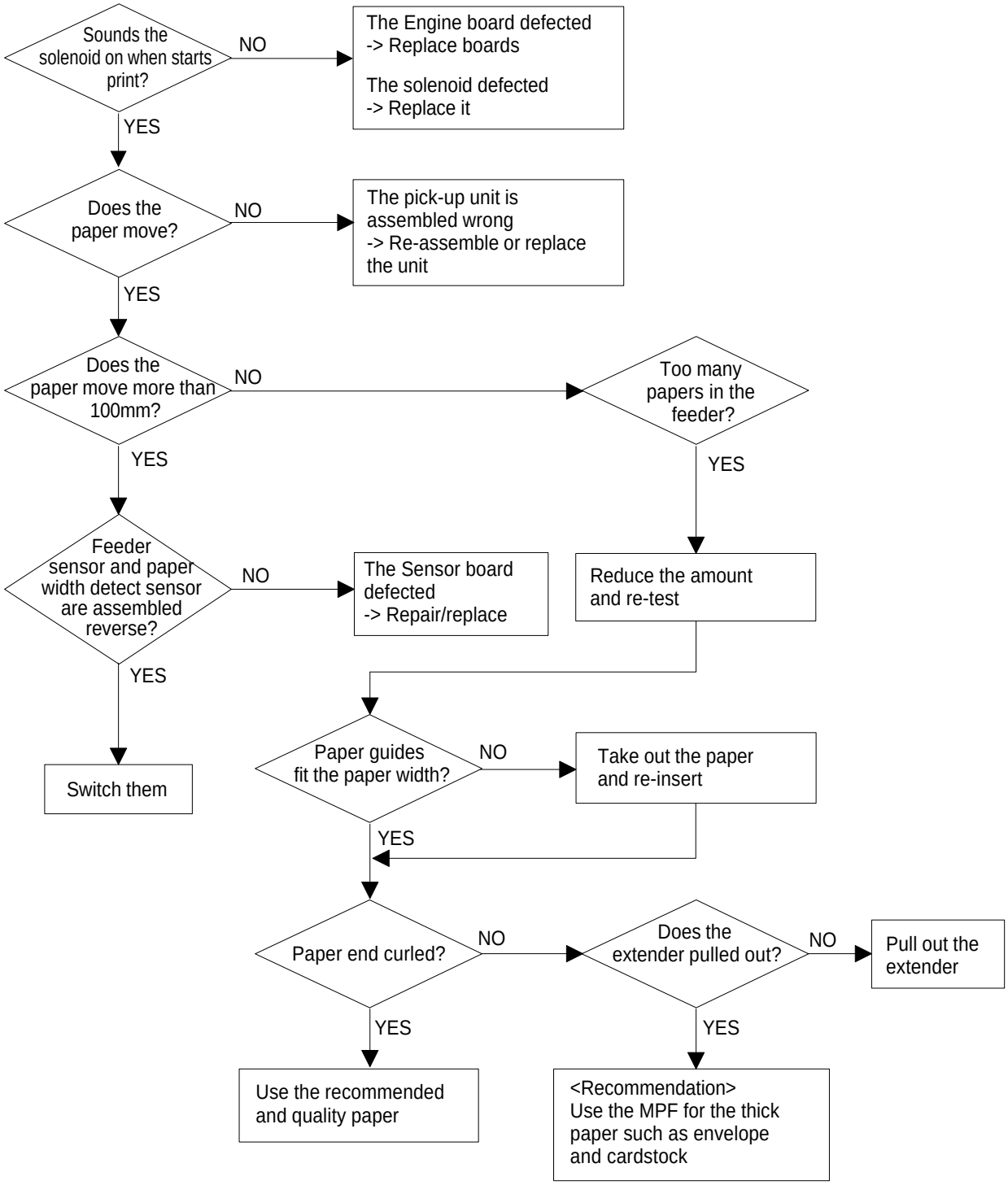
## No Power (LCD NO display LED Off)


Plug in the power cord?
NO
Check the voltage first and plug the power cord
YES
The power voltage supplying is the same as rating?
NO
Supply the power as the rating
YES
The fan revolves when powered on?
NO
Connections on board are OK?
NO
Re-connect firmly and re-test
YES
YES
LEDs blink once when powered on?
NO
Fuse of SMPS if open?
NO
Replace the fuse
YES
YES
The On-Line key is being pressed or shortage on the panel board?
NO
The connection error between controller board and panel board or malfunction of boards.
-> Replace the boards
Shortage between 5V and GND, or between 24V and GND?
NO
Toner cartridge is in the set?
NO
Put in the cartridge
YES
YES
YES
Repair/replace the board
Remove the shortage or replace the board
Detect failure due to the board which detects top cover open or switch error
-> Replace the board or switch

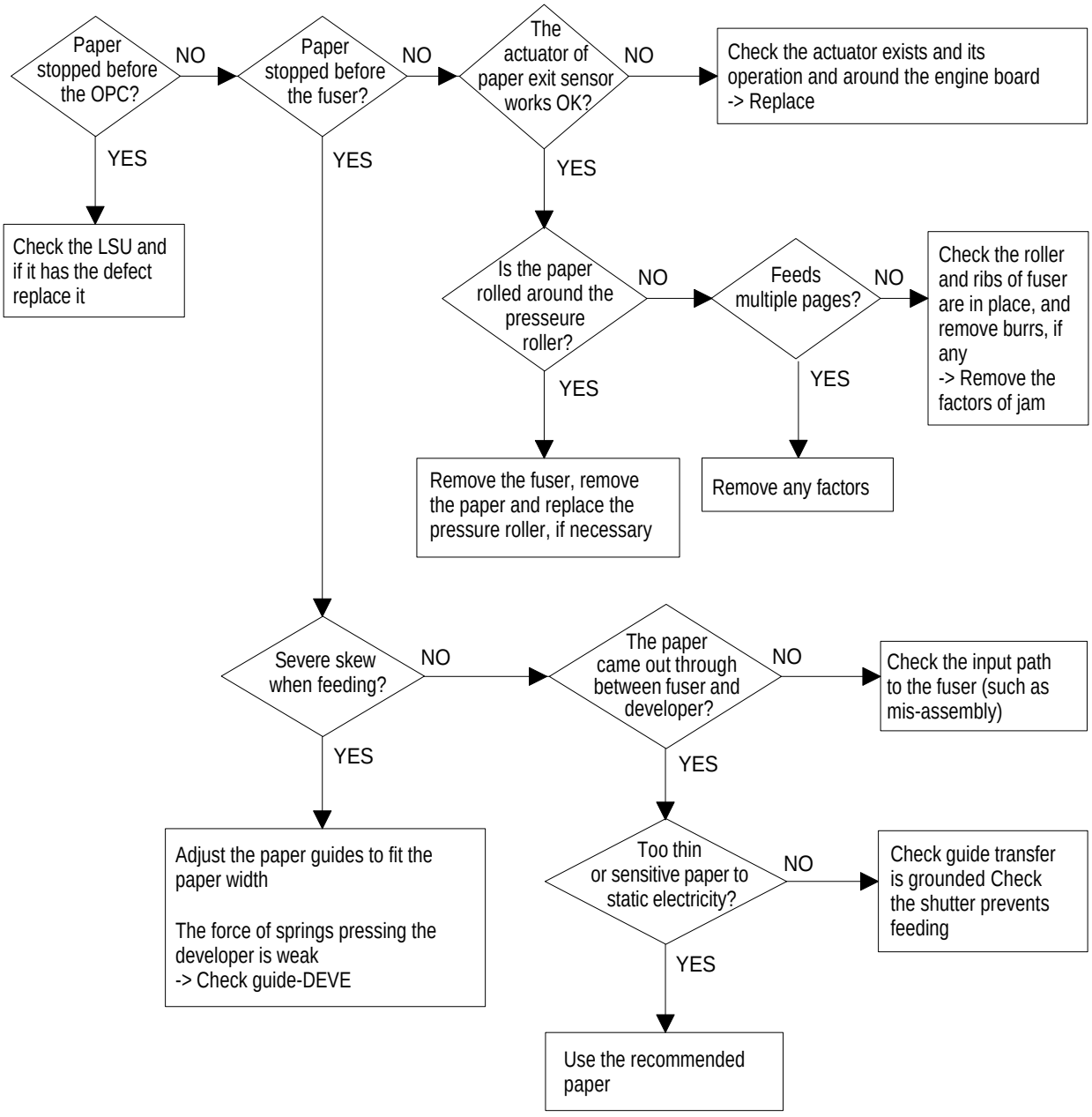
## Fuser Error


Measure the resistance at the both ends of AC Line with covers open
Less than 10W?
NO
Thermostat is open due to the heat etc. -> Replace the thermostat
YES
Remove the covers
AC is being supplied?
NO
Re-assemble the top cover and close it
Check the PCI and fusing control part and CN502 on the SMPS -> Replace the component or replace the SMPS
YES
The voltage of pin #208 of U5 (CPU) on the Main board is about 2.3V when printing?
NO
Thermistor, connecting point or engine board defect -> Repair/replace the component/board
YES
END

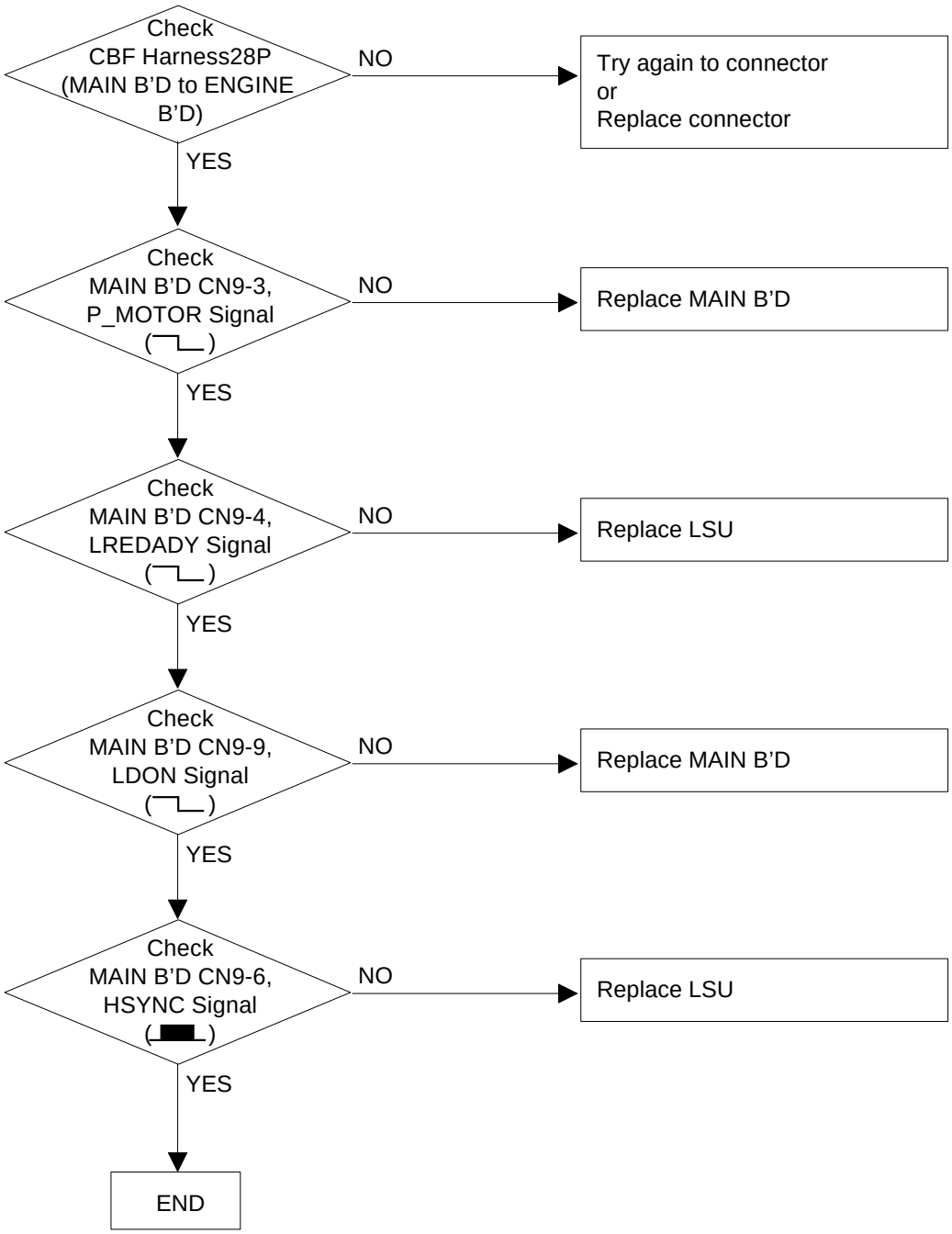
## Paper Jam (Mis-feeding)



## Paper Jam (Jam1)


Paper stopped before the OPC?
NO
Paper stopped before the fuser?
NO
The actuator of paper exit sensor works OK?
NO
Check the actuator exists and its operation and around the engine board
-> Replace
YES
Check the LSU and if it has the defect replace it
YES
YES
Is the paper rolled around the presseure roller?
NO
Feeds multiple pages?
NO
Check the roller and ribs of fuser are in place, and remove burrs, if any
-> Remove the factors of jam
YES
YES
Remove the fuser, remove the paper and replace the pressure roller, if necessary
Remove any factors
Severe skew when feeding?
NO
The paper came out through between fuser and developer?
NO
Check the input path to the fuser (such as mis-assembly)
YES
YES
Adjust the paper guides to fit the paper width
The force of springs pressing the developer is weak
-> Check guide-DEVE
Too thin or sensitive paper to static electricity?
NO
Check guide transfer is grounded Check the shutter prevents feeding
YES
Use the recommended paper

## LSU Error


Check
CBF Harness28P
(MAIN B'D to ENGINE
B'D)
NO
Try again to connector
or
Replace connector
YES
Check
MAIN B'D CN9-3,
P_MOTOR Signal
NO
Replace MAIN B'D
YES
Check
MAIN B'D CN9-4,
LREDADY Signal
NO
Replace LSU
YES
Check
MAIN B'D CN9-9,
LDON Signal
NO
Replace MAIN B'D
YES
Check
MAIN B'D CN9-6,
HSYNC Signal
NO
Replace LSU
YES
END

# 6. Exploded View and Parts List

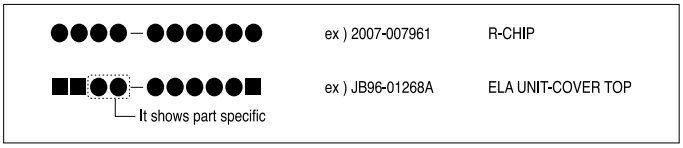

6-1 Main Assembly .....
6-2 Shield Engine Unit Assembly .....
6-3 Engine Assembly .....
6-4 Frame Lower Assembly .....
6-5 Fuser Assembly .....
6-6 Plate-Upper Unit Assembly .....
6-7 OPE Unit .....
6-8 Scan Upper Assembly .....
6-9 Front Assembly .....
6-10 RX Drive Unit Assembly .....


- Deal drawings and service parts are declared for the items with higher rate of inferiority and replaceable in the level of service description only.
- If inferiority occurs, you can replace the parts by the unit declared in deal drawings and service items.

## Way to observe Part Code & Description

Part code and Description is quoted and controlled by determined standard. Refer to this determined standard, it will help with ordering Part.

• **There are two kinds of Part code inscription type.**




( ● : figure, ■ : character (alphabet) )

**Type 1** : Controlled by Company : It can be commonly used for all kinds of product SEC produce. Mostly, electronics Parts.

**Type 2** : Controlled by Division : It is used or one produce. Mostly, Mostly, mechanical Parts.

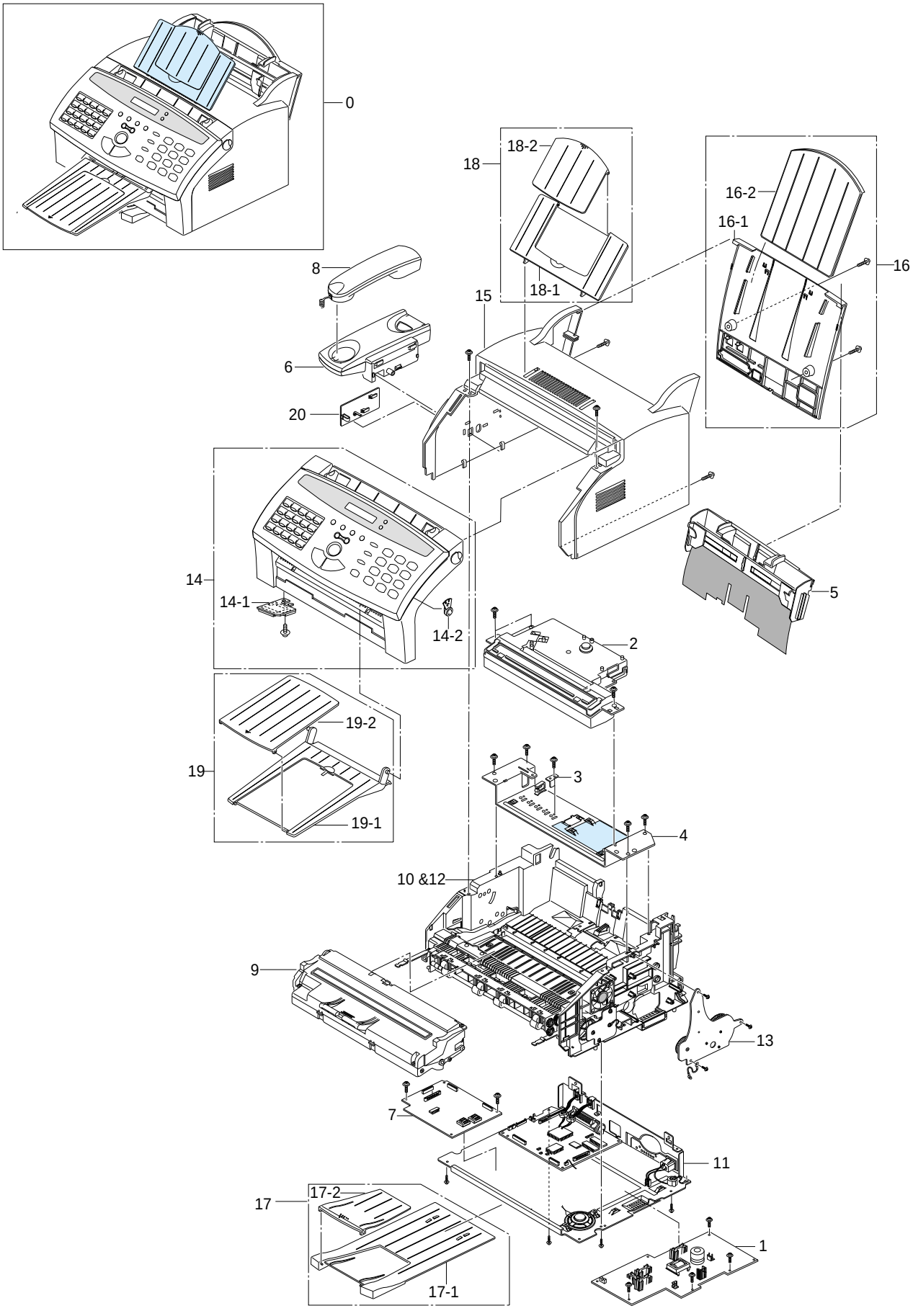
• **A/S privately used part :** It is only used for A/S .

• **Ass'y part :** Assembled by more than 2 Parts. If necessary part is not A/S Part, Ass'y part including necessary par can be used. It is shown in the diagram and drawing of SVC manual.

• Ass'y part and A/S privately used Part is distinguished by part Code and Description.
The are inscription type 2. It is recognized by Part character and front side of description.

| DIVISION | PART CODE | DESCRIPTION |
|---|---|---|
| A/S Private | **81-******<br>(JB81-00039A) | AS-*****<br>(AS-USE) |
| ASS'Y Part | **75-******<br>(JB75-00068A) | MEC-*****<br>(MEC-CHUTE) |
| ASS'Y Part | **92-******<br>(JB92-01131A) | PBA ******<br>(PBA MAIN-CONTROLLER) |
| ASS'Y Part | **97-******<br>(JB97-01089A) | MEA ******<br>(MEA UNIT-PULLEY IDLE) |

# 6-1 Main Assembly

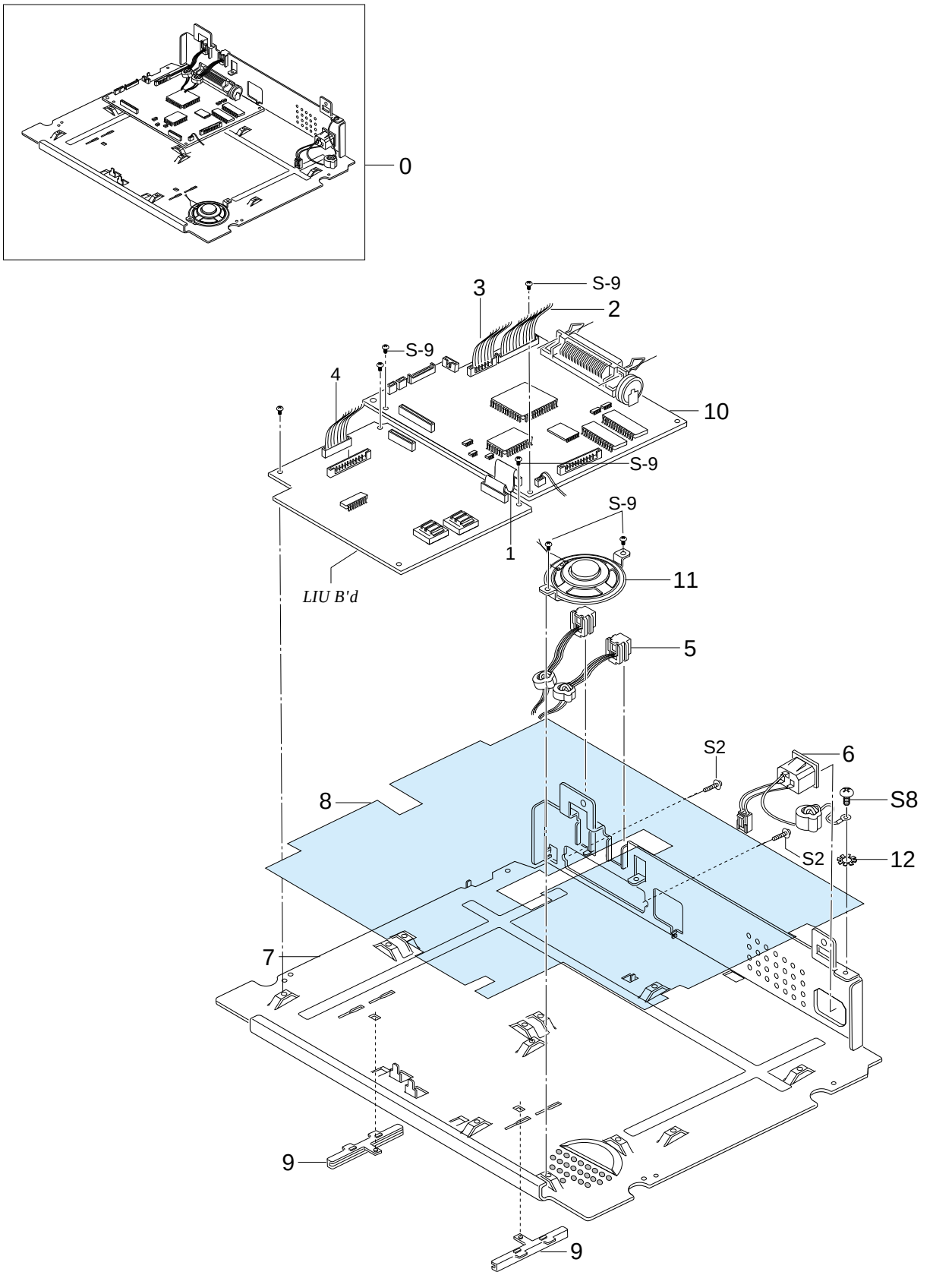


## Main Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | Muratec F-110 | | | | |
| 1 | SMPS-V1 | JC44-00032A | 1 | O | ⚠ 110V |
| 2 | UNIT-LSU | JC59-00006A | 1 | O | |
| 3 | IPR-PLATE_CHANNEL | JC70-00058A | 1 | X | |
| 4 | MEC-PLATE UPPER | JC75-00057A | 1 | O | |
| 5 | MEC-TRAY(P) | JC75-00075A | 1 | O | |
| 6 | MEC-CRADLE | JC75-00083A | 1 | O | OPTIONAL |
| 7 | PBA MAIN-LIU PBA | JC92-01379A | 1 | O | |
| 8 | ELA HOU-HANDSET | JC96-01629B | 1 | O | OPTIONAL |
| 9 | ELA-UNIT DEV APO6 E | JC96-01871A | 1 | X | |
| 10 | ELA HOU-ENGINE ASS'Y | JC96-02086A | 1 | X | |
| 11 | ELA HOU-SHIELD ENGINE | JC96-02087A | 1 | X | |
| 12 | ELA HOU-FRAME LOWER | JC81-00463A | 1 | O | ⚠110V |
| 13 | ELA HOU-RX DRIVE | JC96-01755A | 1 | O | |
| 14 | AS-OPE FRONT MUR | JB81-00777A | 1 | O | |
| 14-1 | PBA MAIN-SCAN | JC81-00472A | 1 | O | |
| 14-2 | PMO-BASHING WHITE | JC72-41306A | 1 | X | |
| 15 | PMO-COVER TOP | JC72-00128A | 1 | O | |
| 16 | MEC-COVER REAR | JC75-00059A | 1 | O | |
| 16-1 | PMO-COVER_REAR | JC72-00167A | 1 | X | |
| 16-2 | PMO-TRAY_LARGE | JC72-00180A | 1 | X | |
| 17 | MEC-STACKER | JC75-00060A | 1 | O | |
| 17-1 | PMO-STACKER_MAIN | JC72-00169A | 1 | X | |
| 17-2 | PMO-STACKER_SUB | JC72-00170A | 1 | X | |
| 18 | MEA UNIT-CHUTE ASS'Y | JC97-01187E | 1 | O | |
| 18-1 | PMO-CHUTE | JC72-00371A | 1 | X | |
| 18-2 | PMO-DUMMY CHUTE | JC72-41334B | 1 | X | |
| 19 | MEC-STACKER | JC75-00084A | 1 | O | |
| 19-1 | PMO-STACK TX (APOLLO) | JC72-00223A | 1 | X | |
| 19-2 | PMO-STACKER TX (B) | JC72-41331D | 1 | X | |
| 20 | PMO-CAP CRADLE | JC72-00488A | 1 | O | |

# 6-2 Shield Engine Unit Assembly

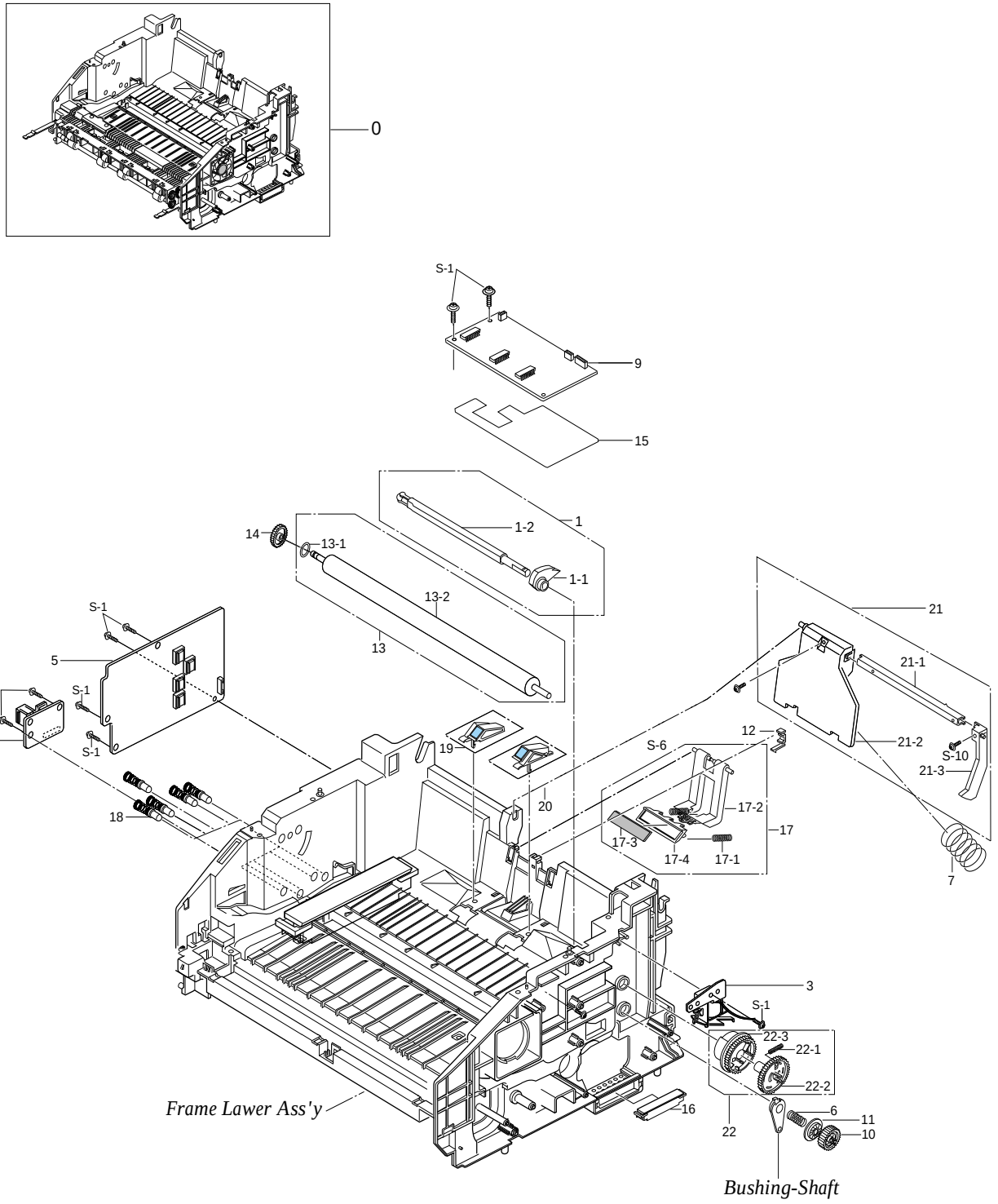


## Shield Engine Unit Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-SHIELD ENGINE | JC96-02087D | 1 | X | |
| 1 | CABLE-FLAT | J3809-001161 | 1 | O | |
| 2 | CBF HARNESS-LSU | JC39-00043A | 1 | X | |
| 3 | CBF HARNESS-MAIN-HVPS | JC39-00109A | 1 | X | |
| 4 | CBF HARNESS-MAIN/HOOK | JC39-00174A | 1 | X | |
| 5 | CBF HARNESS-MODULA 2 | JC39-00175A | 1 | X | |
| 6 | CBF HARNESS | JC39-40022A | 1 | X | INLET |
| 7 | IPR-SHIELD ENGINE | JC70-00200A | 1 | X | |
| 8 | IPR-SHILED SMPS | JC70-00263A | 1 | X | |
| 9 | MEC-GUIDE STAKE ASS'Y | JC75-00087A | 2 | X | |
| 10 | PBA MAIN-MAIN | JC92-01308C | 1 | O | |
| 11 | ELA M/MEDIO AUD-SPEAKER | JC96-01607A | 1 | O | |
| 12 | WASHER-E.T | 6031-000120 | 1 | X | |
| 13 | CBF HARNESS-THERMISTOR | JC39-00045A | 1 | X | |
| S2 | SCREW-MACHINE | 6001-000568 | 2 | X | |
| S8 | SCREW-TAPTITE | 6003-000221 | 1 | X | |
| S9 | SCREW-TAPTITE | 6003-000264 | 11 | X | |

# 6-3 Engine Assembly

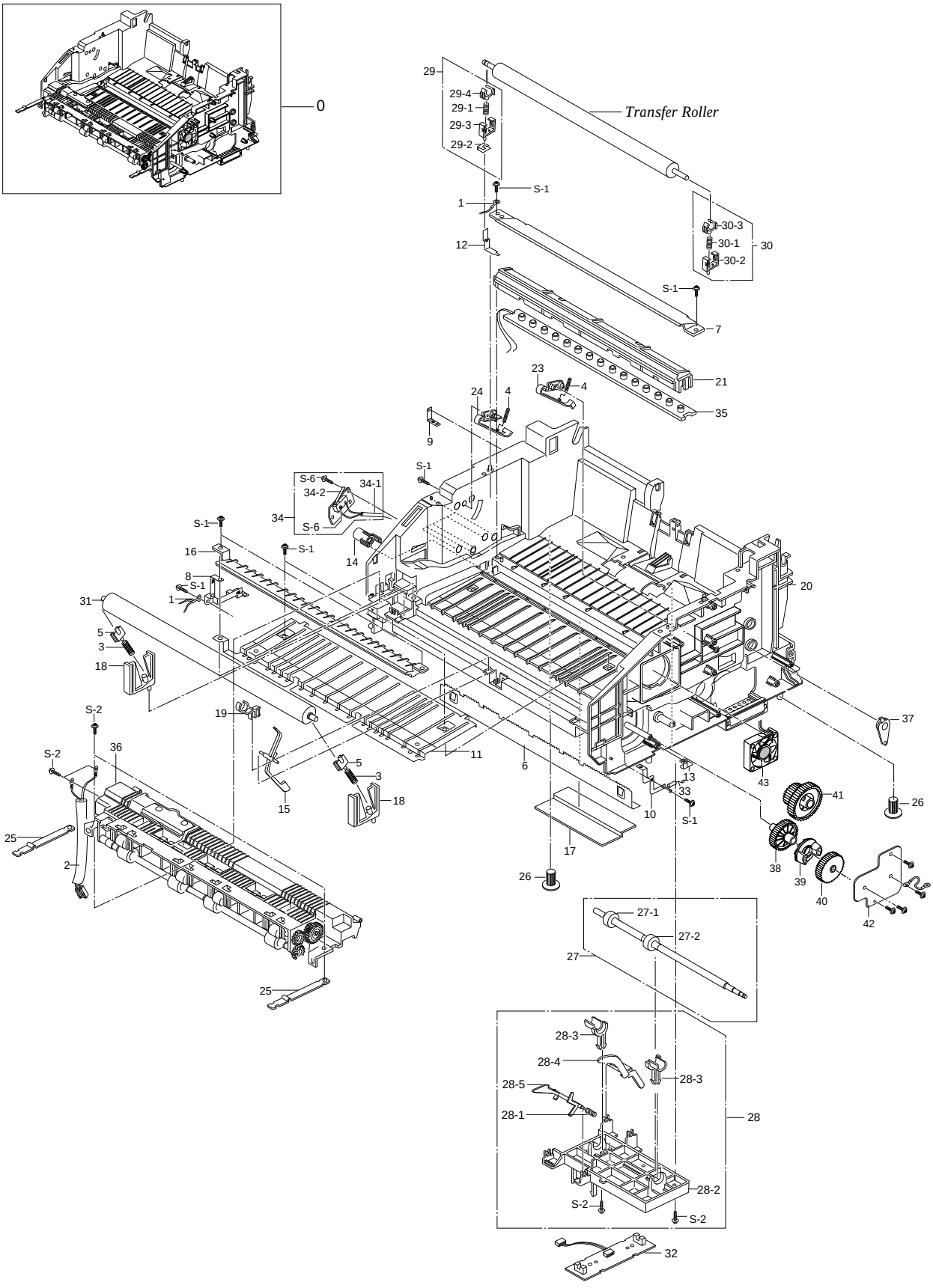


## Engine Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-ENGINE ASS'Y | JC96-02086A | 1 | X | |
| 1 | MEC-CAM PICK UP | JC75-00072A | 1 | X | |
| 1-1 | PMO-CAM_PICKUP | JC72-00107A | 1 | X | |
| 1-2 | PMO-SHAFT_PICKUP | JC72-00108A | 1 | X | |
| 2 | CBF HARNESS-EARTH (TX MOTOR) | JB39-00017A | 1 | X | |
| 3 | SOLENOID-(APOLLO) | JC33-00002A | 1 | O | |
| 4 | CBF HARNESS-MO_SOL | JC39-40584A | 1 | X | |
| 5 | SMPS-HVPS | JC44-00017A | 1 | O | |
| 6 | SPRING-CLUTCH | JC61-00012A | 1 | X | |
| 7 | SPRING-KNOCK UP | JC61-00023A | 1 | X | |
| 8 | PBA MAIN-HOOK 2 | JC92-01378A | 1 | O | |
| 9 | PBA MAIN-ENGINE | JC92-01320A | 1 | O | |
| 10 | PMO-GEAR_FEED | JC72-00115A | 1 | X | |
| 11 | PMO-CLUTCH_FEED | JC72-00116A | 1 | X | |
| 12 | PMO-CAP_PAD | JC72-00124A | 1 | X | |
| 13 | MEA RACK-TR ASS'Y | JC97-01321A | 1 | X | |
| 13-1 | PPR-SPACER DR | JC72-00288A | 1 | X | |
| 13-2 | MEC-TRANSFER ROLLER | JC75-00035A | 1 | O | |
| 14 | PMO-GEAR_TRANSFER | JC72-00179A | 1 | X | |
| 15 | PCT-INSULATOR ENG BD | JC72-00400A | 1 | X | |
| 16 | PMO-DUMMY SIDE | JC72-00624A | 1 | X | |
| 17 | MEC-HOLDER PAD | JC75-00156A | 1 | O | |
| 17-1 | SPRING-PAD | JC61-00054A | 2 | X | |
| 17-2 | PMO-HOLDER PAD | JC72-00535A | 1 | X | |
| 17-3 | PMO-HOLDER PAD LARGE | JC72-00536A | 1 | X | |
| 17-4 | RPR-PAD FRICTION | JC73-00062A | 1 | X | |
| 18 | MEC-TERMINAL | JC75-00049A | 5 | O | |
| 19 | MEC-SIDE PAD(L) | JC75-00050B | 1 | O | |
| 20 | MEC-SIDE PAD(R) | JC75-00051B | 1 | O | |
| 21 | MEC-KNOCKUP ASS'Y | JC75-00053A | 1 | O | |
| 21-1 | IPR-BAR_KNOCKUP | JC70-00042A | 1 | X | |
| 21-2 | PMO-PLATE-KNOCKUP | JC72-00121A | 1 | X | |
| 21-3 | PMO-CAM-KNOCKUP | JC72-00122A | 1 | X | |
| 22 | MEC-GEAR PICK UP | JC75-00056A | 1 | O | |
| 22-1 | SPRING-PICK UP GEAR | JC61-00020A | 1 | X | |
| 22-2 | PMO-GEAR_PICKUP,1 | JC72-00104A | 1 | X | |
| 22-3 | PMO-GEAR_PICKUP,2 | JC72-00106A | 1 | X | |
| S7 | SCREW-TAPTITE | 6003-000196 | 7 | X | |
| S10 | SCREW-TAPTITE | 6003-000266 | 2 | X | |
| S11 | SCREW-TAPTITE | 6003-000119 | 17 | X | |

# 6-4 Frame Lower Assembly

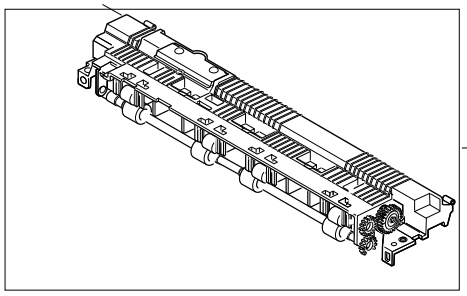


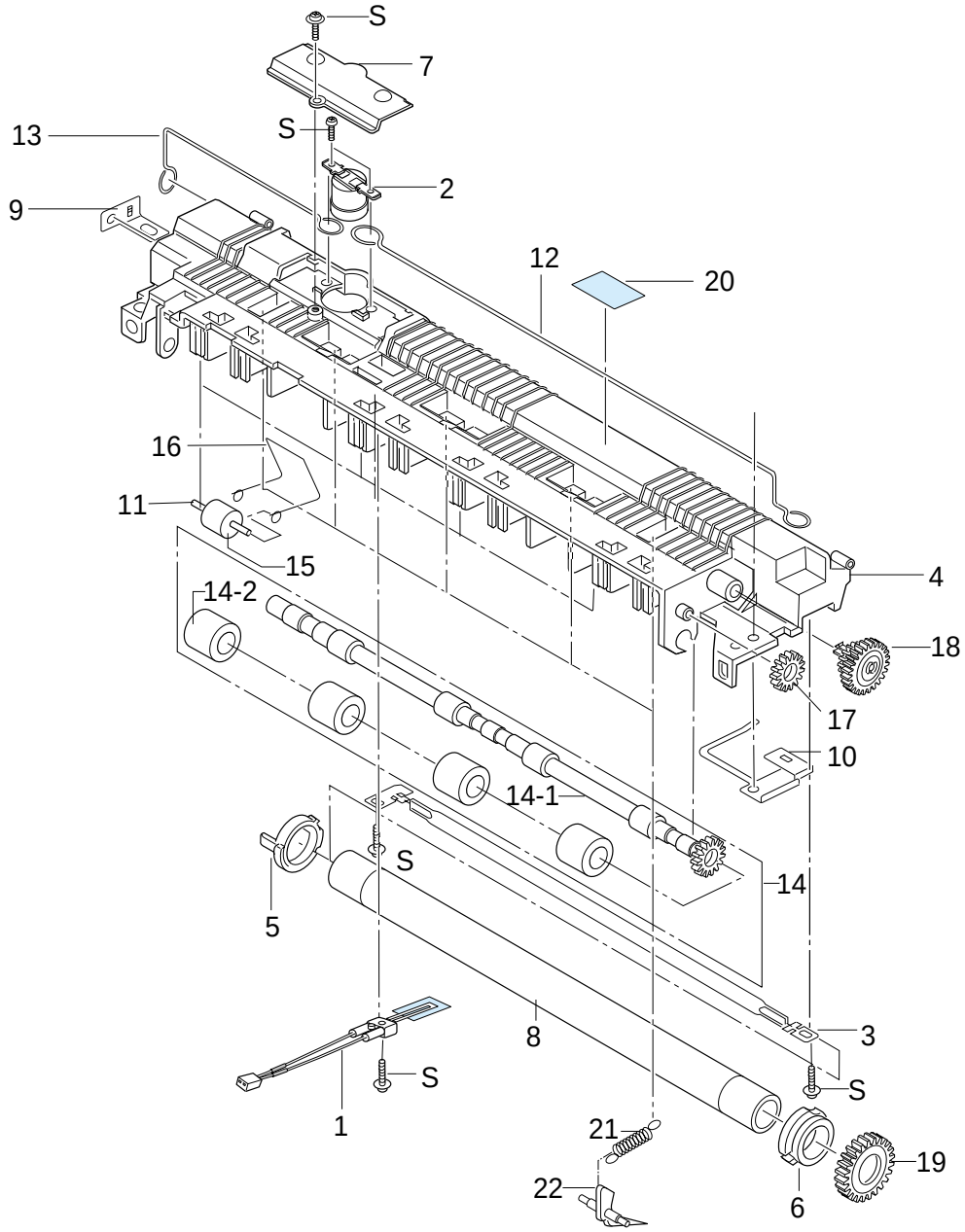
## Frame Lower Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-FRAME LOWER | JC81-00463A | 1 | O | ⚠ 110V |
| 1 | CBF HARNESS-OPE GND | JC39-00036A | 1 | X | |
| 2 | CBF HARNESS-FUSER | JC39-00042A | 1 | X | |
| 3 | SPRING-P/R (APOLLO) | JC61-00014A | 2 | X | |
| 4 | SPRING-GUIDE DEVE | JC61-00038A | 2 | X | |
| 5 | BEARING-PRESSURE R | JC66-10205A | 2 | X | |
| 6 | IPR-SAW_PLATE | JC70-00030A | 1 | X | |
| 7 | IPR-EARTH_TRANS | JC70-00031A | 1 | X | |
| 8 | IPR-GROUND_GUIDE | JC70-00032A | 1 | X | |
| 9 | IPR-GROUND_HVPS | JC70-00034A | 1 | X | |
| 10 | IPR-GROUND_FUSER | JC70-00035A | 1 | X | |
| 11 | IPR-GUIDE-TR | JC70-00039A | 1 | X | |
| 12 | IPR-PLATE-TERMINAL | JC70-00040A | 1 | X | |
| 13 | IPR-GROUND DRIVE | JC70-00067A | 1 | X | |
| 14 | PMO-BUSHING_TERMINAL | JC72-00103A | 1 | X | |
| 15 | PMO-ACTUATOR_EXIT | JC72-00130A | 1 | O | |
| 16 | PMO-GUIDE_INPUT | JC72-00149A | 1 | X | |
| 17 | PCT-FILM SAW | JC72-00217A | 1 | X | |
| 18 | PMO-HOLDER PR | JC72-00531A | 2 | X | |
| 19 | PMO-HOLDER EXIT | JC72-00532A | 2 | X | |
| 20 | PMO-FRAME LOWER | JC72-00533A | 1 | X | |
| 21 | PMO-COVER PTL | JC72-00534A | 1 | X | |
| 23 | PMO-CAP PLTE G/DEV R | JC72-41135A | 1 | O | |
| 24 | PMO-CAP PLTE G/DEV L | JC72-41173A | 1 | O | |
| 25 | PMO-STOPPER EXIT | JC72-41396B | 2 | O | |
| 26 | RMO-RUBBER_FOOT | JC73-00027A | 2 | X | |
| 27 | MEC-ROLLER FEED | JC75-00054A | 1 | O | |
| 27-1 | RPR-ROLLER FEED | JC73-00038A | 2 | X | |
| 27-2 | MEC-SHAFT FEED | JC75-00092A | 1 | X | |
| 28 | MEC-HOLDER FEED | JC75-00055A | 1 | X | |
| 28-1 | SPRING-ACT, FEED | JC61-00019A | 1 | X | |
| 28-2 | PMO-HOLDER_FEED | JC72-00114A | 1 | X | |
| 28-3 | PMO-BUSHING_FEED | JC72-00117A | 2 | X | |
| 28-4 | PMO-ACTUATOR_EMPTY | JC72-00118A | 1 | O | |
| 28-5 | PMO-ACTUATOR_FEED | JC72-00119A | 1 | O | |
| 29 | MEC-HOLDER TR L | JC75-00106C | 1 | O | |
| 29-1 | SPRING-TR(300) | JC61-00024A | 1 | X | |
| 29-2 | IPR-PLATE_TR | JC70-00029A | 1 | X | |
| 29-3 | PMO-HOLDER TR | JC72-00100A | 1 | X | |
| 29-4 | PMO-BUSHING_TR(L) | JC72-00102A | 1 | X | |
| 30 | MEC-HOLDER TR R | JC75-00107C | 1 | O | |
| 30-1 | SPRING-TR(300) | JC61-00024A | 1 | X | |
| 30-2 | PMO-HOLDER TR | JC72-00100A | 1 | X | |
| 30-3 | PMO-BUSHING_TR(R) | JC72-00101A | 1 | X | |
| 31 | MEC-ROLLER_PR 1210 | JC75-00130A | 1 | O | |
| 32 | PBA MAIN-SENSOR | JC92-01197A | 1 | O | |
| 33 | ELA HOU-MOTOR GND | JC96-01579A | 1 | X | |
| 34 | ELA HOU-OPEN SENSOR | JC96-01584A | 1 | O | |
| 34-1 | CBF HARNESS-COVER | JC39-00041A | 1 | X | |
| 34-2 | IPR-BRKT-SENSOR | JC70-00038A | 1 | X | |
| 35 | ELA HOU-PTL ASS'Y | JC96-02312A | 1 | O | |
| 36 | ELA HOU-FUSER 110V | JC81-00439A | 1 | O | ⚠ 110V |
| 37 | PMO-BUSHING SHAFT | JG72-40849A | 1 | X | |
| 38 | GEAR-FU_IN 47 | JC66-00306A | 1 | X | |
| 39 | PMO-HUB GEAR | JC72-00676A | 1 | X | |
| 40 | GEAR-FU_OUT 47 | JC66-00307A | 1 | X | |
| 41 | PMO-GEAR_83/35 | JC72-00154A | 1 | X | |
| 42 | IPR-BRACKET FUSER DRV | JC70-00108A | 1 | X | |
| 43 | FAN-DC | J3103-001085 | 1 | O | |
| S6 | SCREW-TAPTITE | 6003-000152 | 1 | X | |
| S7 | SCREW-TAPTITE | 6003-000196 | 2 | X | |
| S11 | SCREW-TAPTITE | 6003-000119 | 17 | X | |

# 6-5 Fuser Assembly



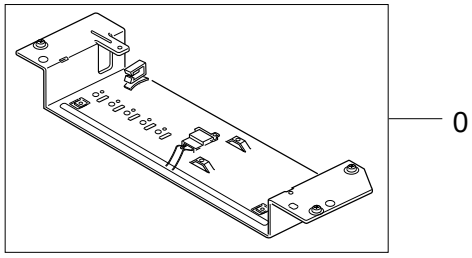



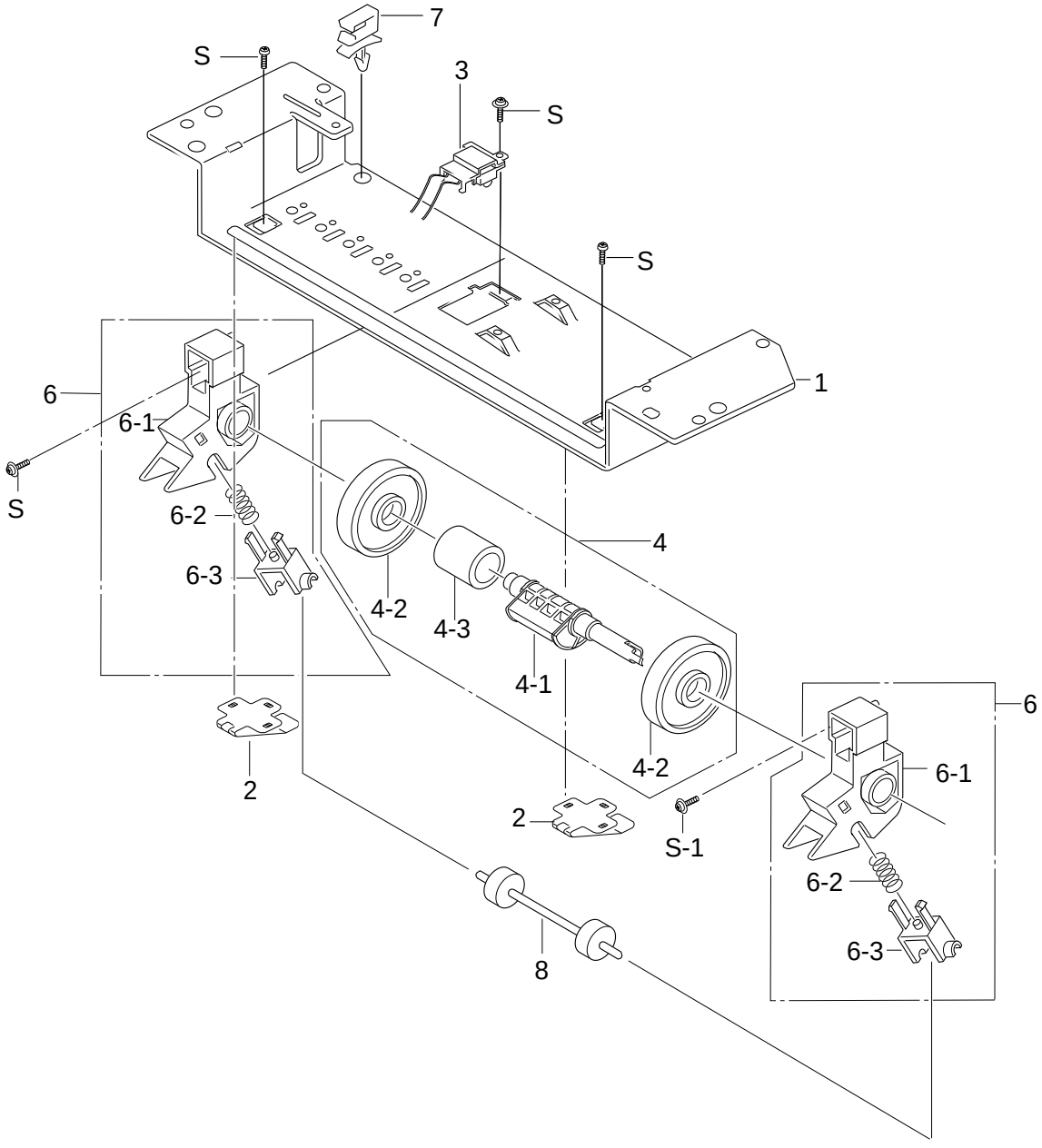
## Fuser Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-FUSER 110V | JC81-00439A | 1 | O | ⚠110V |
| 1 | THERMISTOR-NTC | J1404-001188 | 1 | O | |
| 2 | THERMOSTAT | J4712-000001 | 1 | O | |
| 3 | LAMP-HALOGEN | J4713-001120 | 1 | O | ⚠ 110V |
| 4 | PMO-FUSER_UPPER | JC72-00129A | 1 | X | |
| 5 | PMO-BUSHING H/R L | JC72-00530A | 1 | X | |
| 6 | PMO-BUSHING H/R R | JC72-00529A | 1 | X | |
| 7 | PMO-COVER_THERMOSTAT | JC72-00133A | 1 | X | |
| 8 | NPR-ROLLER HEAT | JC71-00012B | 1 | O | |
| 9 | IPR-ELECTRODE_PLATE | JC70-00043A | 1 | X | |
| 10 | IPR-GROUND_FU | JC70-00044A | 1 | X | |
| 11 | IPR-PIN ROLLER EXIT | JC70-00064A | 4 | O | |
| 12 | IPR-ELECTRODE WIRE1 | JC70-00066A | 1 | X | |
| 13 | IPR-ELECTRODE WIRE,S | JC70-00065A | 1 | X | |
| 14 | MEA ETC-SHAFT EXIT | JC97-01306A | 1 | X | |
| 14-1 | PMO-SHAFT_EXIT(Z15) | JC72-00150A | 1 | O | |
| 14-2 | RMO-RUBBER_EXIT | JC73-00017A | 4 | O | |
| 15 | PMO-ROLLER_IDLE EXIT | JC72-00567A | 4 | O | |
| 16 | SPRING-EXIT | JC61-00017A | 4 | X | |
| 17 | PMO-GEAR_EXIT_DRV16 | JC72-00143A | 1 | X | |
| 18 | PMO-GEAR_EXIT_IDLE | JC72-00146A | 1 | X | |
| 19 | GEAR-FUSER 1210 | JC66-00037B | 1 | O | |
| 20 | LABEL(R)-CAU_HOT_FU | JC68-30928B | 1 | X | |
| 21 | SPRING-CLAW | JC61-00064A | 5 | O | |
| 22 | PMO-GUIDE CLAW | JC72-41128A | 5 | O | |
| S | SCREW-TAPTITE | 6003-000119 | 5 | X | |
| S | SCREW-TAPTITE | 6003-000196 | 1 | X | |

# 6-6 Plate-Upper Unit Assembly



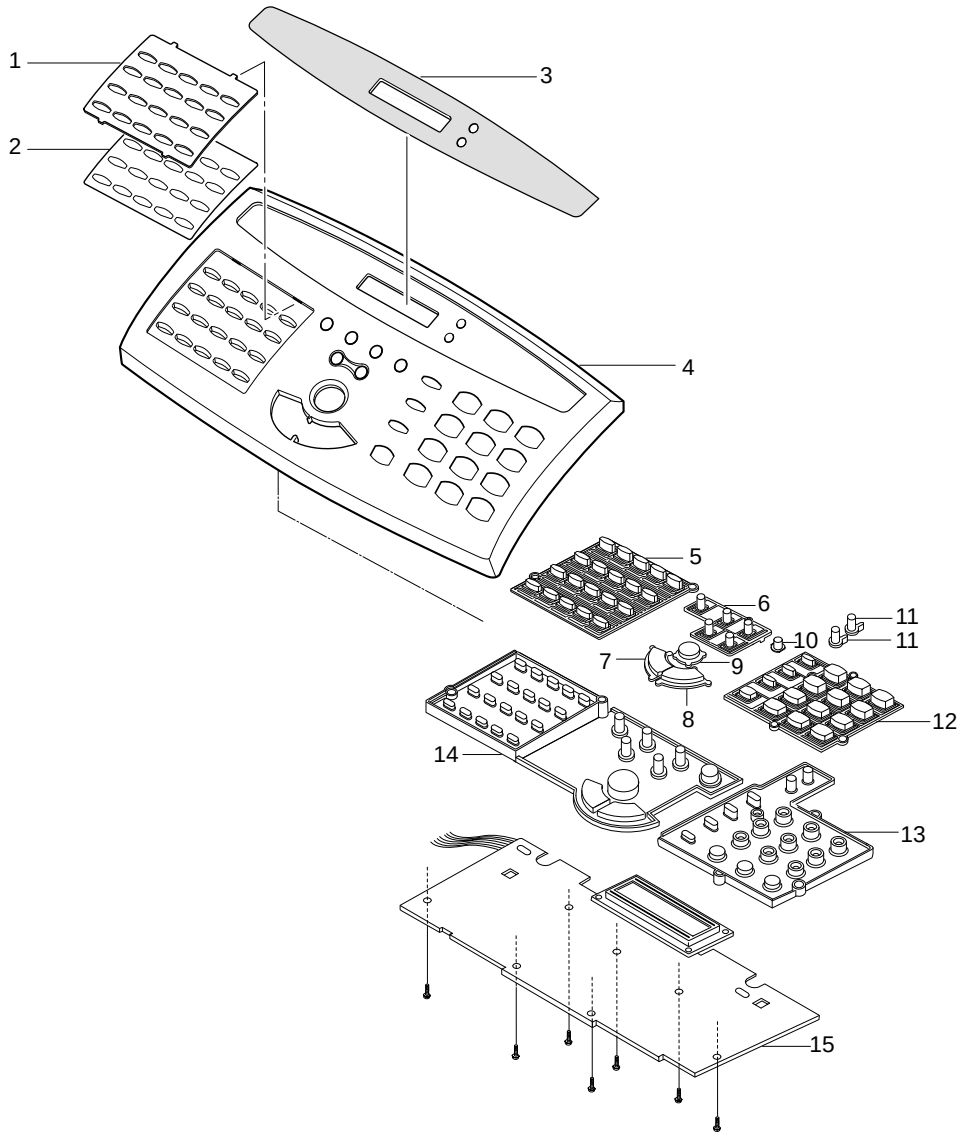



## Plate-Upper Unit Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | MEC-PLATE UPPER | JC75-00057A | 1 | O | |
| 1 | IPR-UPPER-PLATE | JC70-00036A | 1 | X | |
| 2 | IPR-PLATE SPRING DEV | JC70-10223A | 2 | X | |
| 3 | ELA UNIT-FUSE DEVE | JC96-01117A | 1 | X | |
| 4 | MEA ETC-ROLLER PICK UP | JC97-01308A | 1 | X | |
| 4-1 | PMO-HOUSING_PICKUP | JC72-00109A | 1 | X | |
| 4-2 | RMO-ROLLER_PICKUP | JC73-00018A | 1 | X | |
| 4-3 | PMO-IDLE_PICKUP | JC72-00110A | 2 | X | |
| 6 | MEA ETC-IDLE FEED | JC97-01309A | 2 | X | |
| 6-1 | PMO-HOLDER_PICKUP | JC72-00111A | 1 | X | |
| 6-2 | SPRING-FEED | JC61-00011A | 1 | X | |
| 6-3 | PMO-HOLDER_IDLE,FEED | JC72-00112A | 1 | X | |
| 7 | CABLE CLAMP | 6502-000130 | 1 | X | |
| 8 | ICT-ROLLER IDEL FEED | JC70-00154A | 1 | X | |
| S5 | SCREW-TAPTITE | 6003-000113 | 2 | X | |
| S10 | SCREW-TAPTITE | 6003-000266 | 1 | X | |
| S10 | SCREW-TAPTITE | 6003-000266 | 2 | X | |

# 6-7 OPE Unit

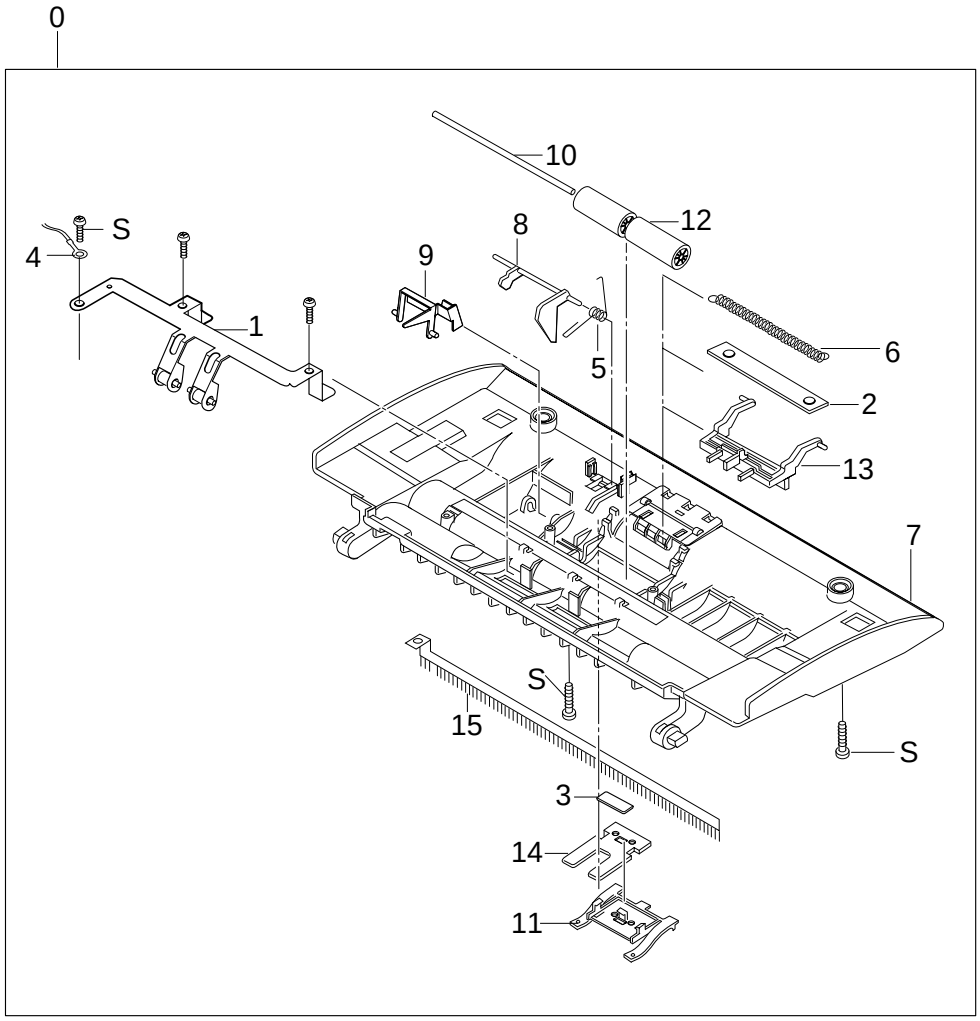



## OPE Unit Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | AS-OPE ASS'Y MUR | JC81-00778A | 1 | O | |
| 1 | MPR-COVER ADDRESS | JC74-00005A | 1 | X | |
| 2 | MPR-PAPER ADDRESS | JC74-00004A | 1 | X | |
| 3 | PCT-LCD WINDOW | JC72-00954A | 1 | X | |
| 4 | PMO-OPE COVER | JC72-00952A | 1 | X | |
| 5 | PMO-KEY OT | JC72-00188A | 1 | X | |
| 6 | PMO-KEY FUNCTION | JC72-00953A | 1 | X | |
| 7 | PMO-KEY COPY | JC72-00097A | 1 | X | |
| 8 | PMO-KEY START | JC72-00098A | 1 | X | |
| 9 | PMO-KEY STOP | JC72-00096A | 1 | X | |
| 10 | PMO-KEY SAVE(T) | JC72-00923A | 1 | X | |
| 11 | PMO-KEY RESOLUTION | JB72-00112A | 2 | X | |
| 12 | PMO-KEY TEL | JC72-00187A | 1 | X | |
| 13 | RMO-TEL | JC72-00954A | 1 | X | |
| 14 | RMO-ONE TOUCH | JC73-00121A | 1 | X | |
| 15 | PBA MAIN-OPE | JC81-00456B | 1 | X | |

# 6-8 Scan Upper Assembly

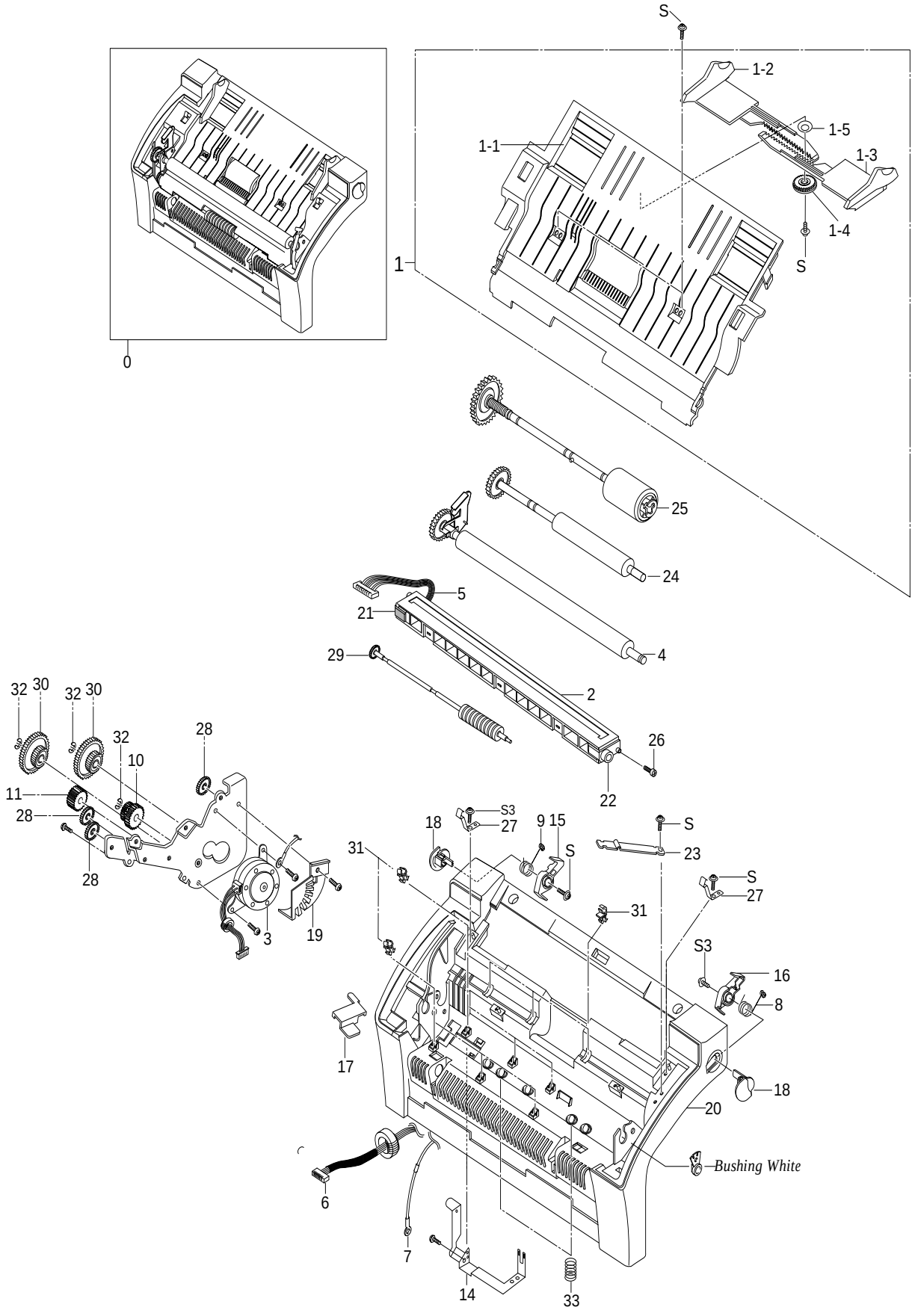



## Scan Upper Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-SCAN UPPER | JC81-00457A | 1 | O | |
| 1 | MEC-PINCH | JG75-10015A | 1 | X | |
| 2 | RPR-SPONGE ADF | JB73-10913A | 1 | X | |
| 3 | MPR-TAPE ADF | JB74-10917A | 1 | X | |
| 4 | CBF HARNESS-SCAN GND | JC39-00101A | 1 | X | |
| 5 | SPRING-SENSOR | JC61-00018A | 1 | X | |
| 6 | SPRING-COIL ADF | JC61-00040A | 1 | X | |
| 7 | PMO-SCAN UPPER | JC72-00671A | 1 | X | |
| 8 | PMO-LEVER SENSOR DOC | JC72-00823A | 1 | X | |
| 9 | PMO-LEVER SENSOR | JC72-41322A | 1 | X | |
| 10 | ICT-SHAFT PINCH | JF70-40521B | 1 | X | |
| 11 | PMO-HOLDER RUBBER | JG72-40044A | 1 | X | |
| 12 | PMO-ROLL PINCH | JG72-40663A | 2 | X | |
| 13 | PMO-SUPPORT ADF | JG72-41083A | 1 | X | |
| 14 | RPR-RUBBER ADF | JC73-00032A | 1 | O | |
| 15 | MEC-BRUSH ANTISTATIC | JG75-10004A | 1 | X | |

# 6-9 Front Assembly

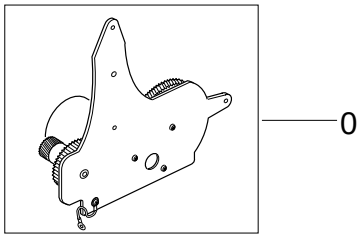


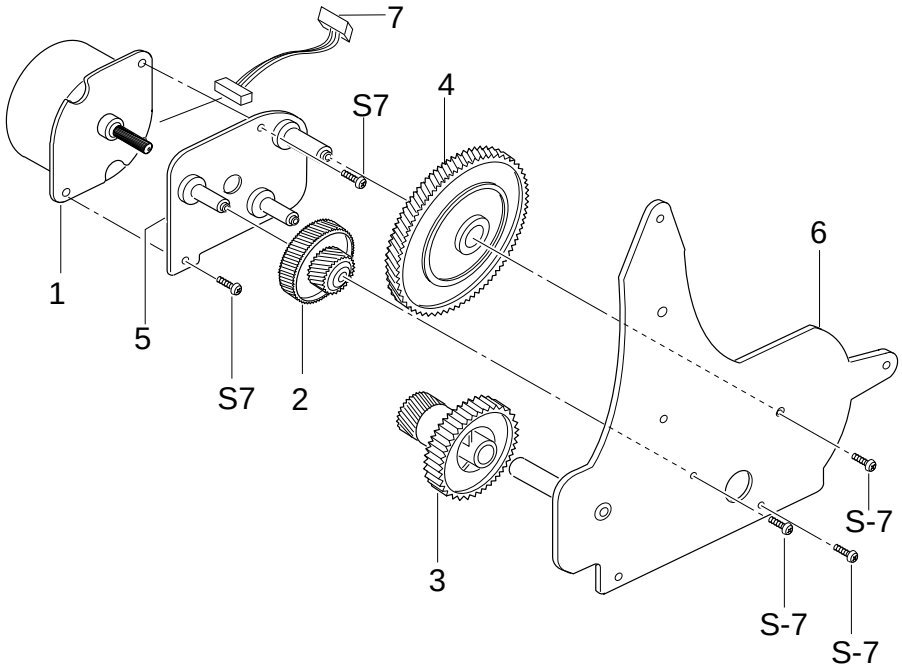
## Front Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-FRONT ASS'Y | JC81-00458A | 1 | O | |
| 1 | MEA ETC-GUIDE PAPER | JC97-01462A | 1 | X | |
| 1-1 | PMO-GUIDE PAPER | JC72-00666A | 1 | X | |
| 1-2 | PMO-GUIDE DOC L | JC72-00136A | 1 | X | |
| 1-3 | PMO-GUIDE DOC R | JC72-00137A | 1 | X | |
| 1-4 | GEAR-PINION | JG66-40003A | 1 | X | |
| 1-5 | IPR-WASHER SPRING CU | JF70-10616A | 1 | X | |
| 2 | CONTACT IMAGE SENSOR | J0609-001125 | 1 | O | |
| 3 | MOTOR STEP-SCAN | JC31-00011B | 1 | O | |
| 4 | MEC-ROLLER WHITE | JC75-00126A | 1 | O | |
| 5 | CBF HARNESS-SCAN/CIS(300) | JC39-00136A | 1 | X | |
| 6 | CBF HARNESS-MAIN/SCAN | JC39-00086A | 1 | X | |
| 7 | CBF HARNESS-SCAN GND | JC39-00101A | 1 | X | |
| 8 | SPRING-LOCKER R | JC61-00027A | 1 | X | |
| 9 | SPRING-LOCKER L | JC61-00028A | 1 | X | |
| 10 | GEAR- 39/20 | JC66-00304A | 1 | X | |
| 11 | GEAR- IDLE 30 | JC66-00305A | 1 | X | |
| 13 | IPR-BRKT MOTOR | JC70-00199A | 1 | X | |
| 14 | NPR-GROUND CIS | JC71-00018A | 1 | X | |
| 15 | PMO-OPEN LOCKER L | JC72-00140A | 1 | X | |
| 16 | PMO-OPEN LOCKER R | JC72-00141A | 1 | X | |
| 17 | PMO-BRKT SCAN B'D | JC72-00222A | 1 | X | |
| 18 | PMO-OPEN BUTTON | JC72-00273A | 2 | X | |
| 19 | PMO-COVER MOTOR | JC72-00670A | 1 | X | |
| 20 | PMO-COVER FRONT | JC72-00673A | 1 | X | |
| 21 | PMO-DUMMY CIS L | JC72-00495A | 1 | X | |
| 22 | PMO-DUMMY CIS R | JC72-00496A | 1 | X | |
| 23 | PMO-STOPPER EXIT | JC72-41396B | 1 | X | |
| 24 | MEC-ROLLER DRIVE | JC75-00123A | 1 | O | |
| 25 | MEA ETC-ROLLER ADF | JC97-01452A | 1 | O | |
| 26 | SPECIAL SCREW | JG60-10001A | 2 | X | |
| 27 | LOCKER-TX | JG64-30001A | 2 | X | |
| 28 | GEAR-IDLE25 | JG66-40036A | 3 | X | |
| 29 | PMO-SHAFT EXIT | JG72-40042A | 1 | X | |
| 30 | PMO-GEAR TRANS(B4) | JG72-40741A | 2 | X | |
| 31 | PMO-BUSHING TX(B4) | JG72-40744A | 9 | X | |
| 32 | RING-C | 6044-000159 | 3 | X | |
| 33 | SPRING CIS | JC61-00015A | 2 | X | |
| S1 | SCREW-MACHINE | 6001-000131 | 2 | X | |
| S3 | SCREW-TAPPING | 6002-000175 | 2 | X | |
| S4 | SCREW-TAPPING | 6002-001078 | 1 | X | |
| S7 | SCREW-TAPTITE | 6003-000196 | 2 | X | |
| S11 | SCREW-TAPTITE | 6003-000119 | 2 | X | |
| S11 | SCREW-TAPTITE | 6003-000119 | 6 | X | |

# 6-10 RX Drive Unit Assembly



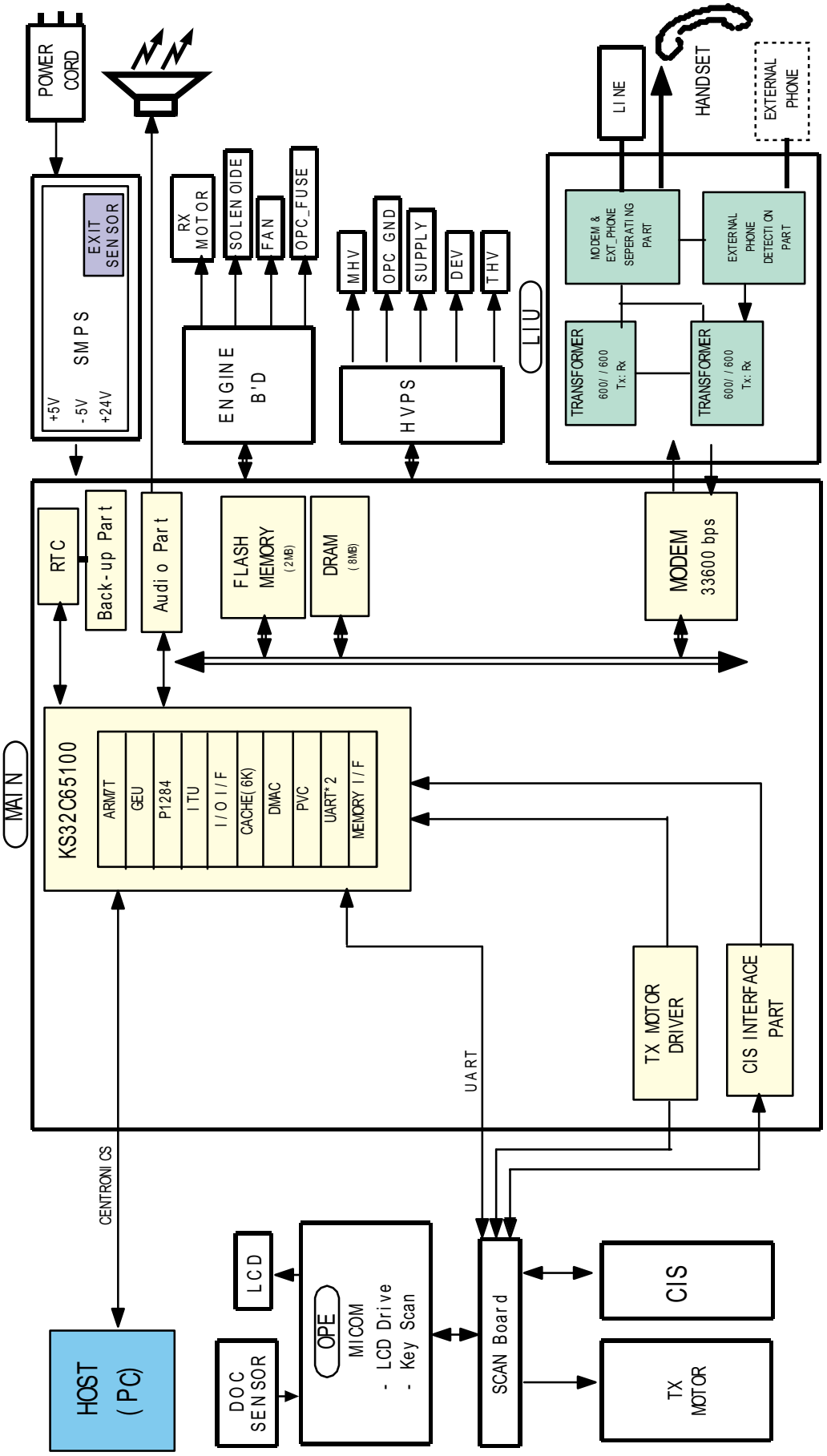




## RX Drive Assembly Parts List

**O** : Service available **X** : Service not available

| No. | Description | SEC.Code | Q'ty | SA | Remark |
|---|---|---|---|---|---|
| 0 | ELA HOU-RX DRIVE | JC96-01755A | 1 | O | |
| 1 | MOTOR-STEP | JC31-00005A | 1 | O | |
| 2 | PMO-GEAR_71/28 | JC72-00152A | 1 | X | |
| 3 | PMO-GEAR_73/22 | JC72-00153A | 1 | X | |
| 4 | PMO-GEAR_132/19 | JC72-00158A | 1 | X | |
| 5 | IPR-BRKT_MOTOR | JC70-00201A | 1 | X | |
| 6 | IPR-BRKT_GEAR | JC70-00202A | 1 | X | |
| 7 | CBF-HARNESS_MOTOR | JC39-00144A | 1 | X | |
| S-7 | SCREW-MACHINE | 6001-000131 | 5 | X | YELLOW |

# 7. Block Diagram



# 8. Connection Diagram